Teaching With Archaeology: Grade 6 Science and Grade 9 Social Studies

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Abstract

Pre-collegiate teachers in Saskatchewan recognize the value of integrating archaeological content into natural and social science curricula. However, there is currently a lack of curriculum-relevant resources available to teachers who are interested in teaching with archaeology.

In addition to meeting Saskatchewan Core Curriculum standards and objectives, the holistic, multi-disciplinary, activities-based approach inherent in archaeology education provides students with opportunities to inquire, investigate, connect, cooperate and collaborate as they develop higher-level understanding and cognition independently and as members of a community of learners (Short and Burke 1991). Thus, the integration of archaeology into existing curricula complements contemporary cognitive development and social constructivist theories of knowledge of scholars Jean Piaget and Lev Vygotsky. Furthermore, learning through archaeology increases students' awareness and appreciation of other cultures, and promotes understanding of the need to protect and conserve cultural resources.

There were two aims in the research: 1) To answer the question: What do teachers require to integrate archaeology concepts, themes and activities into Grade 6 Science and Grade 9 Social Studies curricula; and, 2) To assess the validity of the two assumptions that were taken after the review of the literature: i) If successful archaeology education programs in North America employed the use of hands-on, active learning, then the inclusion of hands-on, active learning in the archaeology education resources developed for the research will also prove effective ; and ii) If successful archaeology education programs in North America incorporated constructivist theories of

learning, including the cognitive development theory of Jean Piaget and the sociocultural theory of Lev Vygotsky in their designs, then reference to constructivist theories of learning, including Piaget's cognitive development theory and Vygotsky's sociocultural theory, will result in the development of appropriate archaeology education materials.

The research occurred between January 2003 and June 2005, and involved the collaboration of nine teachers, a First Nations Elder, 689 Grade 6 and Grade 9 students, and 13 archaeologists. The research design followed a qualitative, action research approach, with the collection of data occurring through semi-structured interviews using McCracken's (1988) long interview method, as well as questionnaires, a survey, and participant observation. An open-coding approach was used to code data collected during the research.

In addition to providing answers to the research question and assessments of the validity of the two assumptions taken in the research, the results indicate that the benefits of integrating archaeological content into pre-collegiate curricula transcend professional jurisdictions. Outcomes include the development of Grade 6 Science and Grade 9 Social Studies archaeology units that can serve as templates and resources for teachers, curriculum developers, and archaeologists. Also, participants learned about: Saskatchewan's human and environmental histories; how archaeology can be used to reveal these histories; and why it is necessary to protect and conserve cultural resources—all goals of avocational and professional archaeological associations across North America.

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Dedication

I dedicate this thesis to my Mom and Dad, who finished their work on earth while I was conducting research and writing this thesis. You both encouraged me to explore the world, to challenge systems, and to enjoy myself and learn as much as I could along the way. For this, and so much more, I am grateful. "Therefore, my beloved brethren, be ye steadfast, unmoveable, always abounding in the work of the Lord, forasmuch as you know that your labour is not in vain in the Lord" (1 Corinthians 15:58, KJV).

Table of Contents

List of Tables

List of Figures

1. Introduction

Teachers in Saskatchewan strive to provide their students with course content that meets Core Curriculum standards and objectives, and engages them in meaningful learning experiences. Many teachers view the study of archaeology as one approach they can take to enliven and engage students in the study of the natural and social sciences. The holistic, hands-on nature of archaeological investigation, which is imparted to students in the process of its study and application, lends itself well to both natural and social sciences courses, as well as to a range of other core and optional subjects including science, social studies, history, mathematics, arts education, physical education and native studies.

Delivery of curricula through archaeology education is complementary to contemporary learning theory as it supports students' development of higher-level thinking skills and provides them with opportunities to develop and enhance their communication skills through the social interaction that is associated with the small- and large-group discussions and group work that typically take place during an archaeology education program.

Participation in archaeology education can instil within teachers and students a better understanding of the human past, a greater appreciation of the value of cultural resources and why is it necessary to protect and conserve them, and an awareness of the importance of context and method in archaeological practice,

Archaeology has a great deal to offer pre-collegiate teachers and students who are living, teaching and learning in an increasingly multicultural and diverse society. According to White (1997:290), teaching with archaeology is one approach that can be taken in the classroom to discuss topics that may otherwise be considered sensitive or not open for discussion. By integrating archaeological content into existing curricula, teachers can support and provide students with information that will allow them to gain a better understanding of peoples and cultures other than their own.

However, as a course of study, archaeology holds only a marginal position in the Saskatchewan classrooms. Reasons for this include the lack of involvement and input from archaeologists into the processes associated with revisions to the Saskatchewan Core Curriculum (which occurs approximately every 10 years), and the lack of appropriate archaeology teaching resources that are available to teachers who are interested in teaching with archaeology. Ellick (1990:10) and White (1997:290) contend that many teachers avoid using anthropology in their classrooms due to their lack of understanding and guidance on how to proceed with sorting through and understanding the interpretations of culture and diversity. One of the contributing factors to this shortcoming could be the lack of emphasis on anthropology or archaeology in university-level education courses. According to Lanouette (1985:331), high school anthropology (which includes archaeology) courses are languishing due to the "dearth of appropriate, stimulating classroom materials…. High School anthropology textbooks are almost an extinct species, and the few that exist are inadequate."

Examination of the Grade 6 Science and Grade 9 Social Studies textbooks used by the teachers who participated in the research revealed that their focus is primarily on

cultures and geographic regions associated with areas outside the Northern Plains and Canada, including the Mediterranean, the Middle East, Africa, Asia and Mesoamerica. The textbook used by the Grade 9 Social Studies teachers and students, *Echoes from the Past: World History to the 16th Century* (Newman 2001), covers a wide range of locations and subjects, including China, Japan, the Middle East, Greece, Rome, India, as well as the Aztecs, the Maya, the Inca, and members of various African kingdoms, however includes only three pages that include information about Canada: in the prologue (pp. 7-9), and the last chapter of the textbook (p. 645). It is ironic that the prologue of this textbook includes the following text:

> Imagine knowing nothing about what went on before you were born, with no idea of the life your parents or grandparents lived. What if you had no understanding of how Canada and its cultures developed. In effect, you would suffer from 'cultural amnesia'—unaware of your heritage and your past. You would be totally confused by the world around you (Newman 2001:3).

The researcher compiled listings of the archaeology-related resources held in the collections at the libraries of the two schools that participated in the research, as well as the Stewart Resources Centre (located at the Saskatchewan Teachers' Federation in Saskatoon). At the time the research was conducted, the inner-city elementary school's library collection held no Canadian or northern plains-based archaeology resources, while the suburban high school library collection held two books with Canadian content. Using *archaeology* as the key word in subject and title searches, the Stewart Resources Centre's 2003 catalogue database listed 38 publications that included archaeological content. A perusal of these materials revealed that the content of 36 of these 38 resources focussed on Rome, Jordan, Egypt, Mesopotamia, Greece, and Mesoamerica, while only two of these resources, *A Handbook for Teaching Archaeology in Saskatchewan Schools*

(Rollans 1990) and *Windows on the Past* (Peturson and Shields 1997) included content relevant to Saskatchewan and northern plains histories.

The erroneous notions and images attributed to archaeologists, such as the archaeologist as an adventurous treasure hunter similar to the lead character in the Indiana Jones movies, have also posed challenges to teachers interested in teaching with archaeology. Such notions and images have influenced some teachers to see archaeology as an exotic, frivolous, irrelevant subject that is not suitable for inclusion in curricula (Devine 1991:11).

On this same issue, Dale asserts that

> …educational programs in archaeology have been largely ineffective, despite years of accumulating archaeological artifacts in museums, as many members of the public still do not have a good understanding of what archaeologists actually do, nor of the goals of their research (Dale 2000:4).

Pretty (2000:215) suggests that archaeology education can be used to relieve educators and students who may be "burdened with archaeological 'misprints'" of the past.

Public outreach was not a part of archaeological practice until the late 1960s and early 1970s, when environmental and conservation issues were of great concern to professional archaeologists who were witnessing escalating site destruction and loss of the archaeological record (McGimsey 2003:612; Davis 1971, 1972; Smardz Frost 2004:60). Over the past three decades, archaeologists have concluded that pre-collegiate teachers and students are one of the largest untapped resources that can be turned to to meet professional and ethical goals of increased public outreach and involvement.

While this response has resulted in an increase in the number of archaeology education resources available in North America, the development and dissemination of

many of these resources has occurred in relative isolation (Friedman 2000:13), with a lack of coordinated direction and delivery between archaeology educators and those involved in curriculum writing and delivery (Lerner 1991:10). As is often the case when people work in isolated environments, the individuals who developed many of these resources were unaware of and therefore unable to communicate with others involved in the development and delivery of archaeological teaching resources. This resulted in the creation of archaeology-based resources that focussed on specific locations and sites, and included local and regional information, thus preventing some teachers from being able to use these resources as they were unable to devote the time required to adapt and adequately acquaint themselves with the materials before they were appropriate for delivery in the classroom. The teachers involved in this research faced similar barriers.

1.1 Purpose of the Research

The purpose of the research was to collaborate with Grade 6 Science and Grade 9 Social Studies teachers in the development, testing and evaluation of curriculum-relevant archaeology education resources in order to answer the research question and assess the validity of the two assumptions, as described in 1.2 and 1.3.

1.2 Research Question

The question guiding the research was: What do teachers require to integrate archaeology concepts, themes and activities into Grade 6 Science and Grade 9 Social Studies curricula?

1.3 Assumptions

After a review of the literature describing archaeology education programs in North America (described in Chapter 2) and theories associated with contemporary learning and cognitive development theories focussing on children, the following two assumptions were taken and assessed for their validity in the research: 1) If successful archaeology education programs in North America employed the use of hands-on, active learning, then the inclusion of hands-on, active learning in the archaeology education resources developed for the research will also prove effective; and, 2) If successful archaeology education programs in North America incorporated constructivist theories of learning, including the cognitive development theory of Jean Piaget and the sociocultural theory of Lev Vygotsky in their designs, then reference to and inclusion of aspects of constructivist theories of learning, including Piaget's cognitive development theory and Vygotsky's sociocultural theory, will result in the development of successful archaeology education materials in the research.

1.4 Significance of the Research

The outcomes of this research are significant in that they benefit the professions of both archaeology and education. Teachers now have access to archaeology-based content that they can integrate into Grade 6 Science and Grade 9 Social Studies courses. Furthermore, the students and teachers who participated in the research gained a clearer understanding of Saskatchewan's and Canada's human past, they have an awareness of the importance of context and method in archaeological practice, and they gained an appreciation of the value of cultural resources and the need for their protection and conservation.

1.5 Research Perspective, Type and Methods

The aims of the research, and the proactive nature of the teachers who participated in the research, influenced the researcher to adopt a qualitative, action research approach in the research, with the collection of data involving semi-structured interviews using McCracken's (1988) long interview method, as well as questionnaires, a survey, and participant observation.

1.6 Key Terms

Appropriate: When used in reference to the archaeology units associated with this research, this word refers to materials that are Saskatchewan Core Curriculum-relevant, adaptable and accessible to teachers.

Curriculum: Unless otherwise noted in this thesis, this term refers specifically to the Saskatchewan Core Curriculum and documents associated with the web-based Evergreen Curriculum.

Educator and ***Teacher***: These two terms are used interchangeably throughout the text of the thesis. Both uses refer to an individual who provides intellectual and social instruction to students in a formal setting such as a classroom (Webster's Online Dictionary, electronic document available at: http://www.websters-online-dictionary.org/definition/teacher).

Mock and ***Simulated***: The two terms have similar meanings, both referring to an imitation. The word simulated is used throughout the thesis in reference to the site at the suburban high school.

Archaeology Education and ***Public Archaeology***: While the two terms are not synonymous, they are related. In the case of this research and thesis, the term

archaeology education refers to using archaeological concepts, themes and activities as a vehicle that teachers can use to deliver curricula. It does not refer to teaching archaeology as a discipline, as would be done in college and university courses. The term public archaeology is inclusive, and refers to a number of different public initiatives in addition to education, including cultural resources management, public field schools, public meetings and workshops. The term archaeology education will be used throughout the thesis, with the use of public archaeology used when applicable.

Resource and ***Material***: These terms are used interchangeably throughout the text of the thesis, and imply the same thing: "the means available to achieve an end, fulfil a function" or "a person or thing of a specified kind or suitable for a purpose" (Webster's Online Dictionary, electronic document available at: http://www.websters-online-dictionary.org/definition/teacher).

1.7 Limitations of the Study

The non-random sampling of participants, specifically the teachers at both schools, could be viewed as a limitation of the study as some of the results of the study, particularly those that were drawn from the data collected from teachers, may be considered inappropriate for generalization to comparable populations involved in similar types of research.

A second limitation of the study stems from the inner-city elementary school teachers' request not to take photographs during the research. This resulted in fewer data being collected at this school, as well as no images of students and teachers from this school in the thesis.

A third limitation in the study occurred during the research conducted at the suburban high school, when it was decided by teachers and the researcher that students would be better served by measuring their artifacts using a south and east provenience from the unit datum rather than north and east as is used in standard archaeological excavation. The teachers' rationale for using south and east measurements was based on the consideration that their students' understanding of the site being located south and east of the main datum point would be jeopardized if we used north and east proveniences for the measurement of artifacts/features recovered during unit excavations. The researcher accepted the teachers' request based on this rationale.

1.8 Chapters Summary

Chapter 2 provides context for the research as regards theory and practice in archaeology education, and includes descriptions of: 1) motivations for the research; 2) the current state of history and social studies education in Canada; 3) archaeology education resources available in Saskatchewan, the rise of public archaeology and archaeology initiatives in North America, and the ethical responsibilities of professional archaeologists practising in North America; 4) what North Americans think about including archaeology in pre-collegiate education; 5) societal changes and their effects on the transmission of information in the classroom; 6) theories of curriculum development; 7) the Saskatchewan Core Curriculum, with reference to Grade 6 Science and Grade 9 Social Studies; 8) constructivist theories and their relevance to teaching with archaeology, with reference to Piaget's cognitive constructivism and Vygotsky's social constructivism; and 9) how learning and context are inextricably linked to cognitive development.

A description of the literature reviewed during the research is provided in Chapter 3. This review focussed on nine subject areas: 1) the ethical responsibilities of archaeologists; 2) archaeology education initiatives in North America; 3) what North Americans think about including archaeology in pre-collegiate courses; 4) the different cultures of archaeologists and educators; 5) theories of curriculum development; 6) the Saskatchewan Core Curriculum, specifically Grade 6 Science and Grade 9 Social Studies; 7) the relevance of Piaget's cognitive constructivist/cognitive development theory to archaeology education; 8) the relevance of Vygotsky's social constructivist/ sociocultural theory to archaeology education; and, 9) the use of simulated sites in archaeology education

Chapter 4 provides descriptions of actions and activities associated with the research, including: 1) the rationale for the approach followed in the research; 2) the assumptions that served as devices or starting points for further investigation in the research; 3) coursework content relevant to the research, and establishing relationships with teachers and administrators early in the research; 4) University of Saskatchewan Research Ethics Board (REB) Ethical Guidelines governing research involving human subjects; 5) instruments used in the collection of data; 6) employee and volunteer assistance during the research; 7) the research conducted at the inner-city elementary school; 8) the research conducted at the suburban high school; and 9) steps taken to analyze the data collected during the research.

Results of the research are presented in Chapter 5. These data provide responses to the research question, as well as assessments of the validity of the two assumptions that were taken after the review of the literature.

Chapter 6 presents a discussion of the results presented in the previous chapter, and draws conclusions based on this discussion.

Chapter 7 makes a recommendation for future research.

2. Background

This chapter provides context for the research as regards theory and practice in archaeology education, and includes descriptions of: 1) motivations for the research; 2) the current state of history and social studies education in Canada; 3) archaeology education resources available in Saskatchewan, the rise of public archaeology and archaeology initiatives in North America, and the ethical responsibilities of professional archaeologists practising in North America; 4) what North Americans think about including archaeology in pre-collegiate education; 5) societal changes and their effects on the transmission of information in the classroom; 6) theories of curriculum development; 7) the Saskatchewan Core Curriculum, with reference to Grade 6 Science and Grade 9 Social Studies; 8) constructivist theories and their relevance to teaching with archaeology, with reference to Piaget's cognitive constructivism and Vygotsky's social constructivism; and 9) how learning and context are inextricably linked to cognitive development.

2.1 One Day At Wanuskewin Heritage Park: Motivation for the Research

In June 2001, while the researcher and a colleague were participating in an archaeology field school at the Cut Arm site (FbNp-22) located at Wanuskewin Heritage Park (located approximately 5 km. north of Saskatoon), a high school teacher and his students stopped by to watch us work. As part of that year's field school curriculum, Professor Ernest Walker instructed students to serve as public archaeologists by sharing

information about the archaeology of the Park and the excavations in progress with visitors to the site.

When the teacher and his students approached our excavation block, we were examining a potsherd that had been recovered a couple of minutes before they arrived. The teacher noticed us analyzing the artifact, and asked: "Did you just find something?" I replied, "Yes, a piece of pottery." He asked: "How old is it?" We told the teacher that given the provenience of the potshard and its relation to the site and other sites in the Park, and also based on a preliminary examination of the physical characteristics of the artifact, it could date to between 250 and 1,200 years old, and be associated with the Old Woman's cultural phase. Then, with his students standing around him and listening closely to our conversation, the teacher asked: "When did Europeans teach Indians to make pottery?" Initially stunned by the question, we then realized that before us was an opportunity to fulfil our role as public archaeologists.

We took turns informing the teacher and students that, according to archaeological evidence borne out of research previously conducted at the Park, Aboriginal peoples had been coming to Wanuskewin for at least the past 6,000 years. We also informed them that pottery had been present on the northern plains for approximately 2,000 years, and that, with the exception of rare explorers who made their ways through the prairies before them, Europeans arrived in this part of Canada around 250 years ago. This information was provided with the hope that the teacher and his students would connect the information as presented, and draw the conclusion that the introduction and presence of pottery on the northern plains predated the arrival of Europeans in this region, and, in the process, understand that Europeans did not "teach

Indians to make pottery." While we were certain the teacher and his students heard what we shared with them, they did not provide feedback confirming they understood it. The teacher and students were in a hurry to make their way back to the Park's Visitor's Centre, so we thanked each other for time spent and information shared, and the group continued on their way along the Path of the People.

After the group left, we resumed our fieldwork, and we talked about the teacher's question. We wondered where such a notion came from. We wondered if other teachers held such misconceptions about Canadian and northern plains histories. We agreed that it would be a good thing if teachers and students could learn about history through lessons that included archaeological content. We also agreed that with their unique education, knowledge, experience, and access to resources, archaeologists were in a unique position, and should take the initiative and collaborate with teachers and curriculum developers in the development and delivery of appropriate educational resources that could be integrated into the existing curricula.

2.2 The Current State of History and Social Studies Education in Canadian Classrooms

The lack of awareness of Canadian history extends beyond Saskatchewan classrooms, resulting in students graduating from high school lacking a basic understanding of Canadian history.

University of Saskatchewan lecturer, Connie Pine (pseudonym) has observed a lack of preparedness among students enrolled in introductory-level history and native studies courses (personal communication 2006).

> I can say, unequivocally, that in my 12 years of teaching, I have no doubt that students have not come from high school with any understanding of Canadian

> history, let alone a 'good' understanding. I'm not sure if this is the fault of the curriculum, teachers, parents, communities, or all of these. I find that the little bit students know—which, again, I'm not sure I would even qualify as 'understanding' is usually what I consider to be 'factual'—they usually (but certainly not always) know when Canada became a country, know how many provinces and territories we have, the first Prime Minister, our founding legislation, etc. But they certainly do not have any understanding of any social, familial, cultural, racial, political, or gendered history in this country, and they certainly have no understanding of the history of the people of the First Nations prior to contact, during contact and after contact (personal communication 2006).

In the article "Education system failing students when it comes to history," Foot (2005:B8) cites results of a 2005 Ipsos-Reid poll of 1,041 Canadians to support his assertion that "Canadian students are finishing high school without a basic understanding of their country's history."

Contributing to this shortcoming is the higher value that has been placed on math and science courses by curriculum developers, and the relatively low popularity among high school students for history as a subject of study (Davis 2000:10-11).

Under the current Saskatchewan Core Curriculum, in addition to meeting other curricular requirements, students may graduate from high school if they have enrolled in and achieved a passing grade in three secondary-level social sciences courses. They must enrol in one of History, Native Studies or Social Studies in Grades 10 and 12, and must select their third compulsory social science credit from either the Grade 11 courses History, Native Studies, Social Studies, Economics, Geography or Psychology, or the Grade 12 courses History, Native Studies, Social Studies, Law, Economics, Geography or Psychology. In other words, the Saskatchewan Core Curriculum requires that high school students enrol in and receive a passing grade in only three secondary-level social sciences courses, with no requirement for continuity in course selections. A student could therefore satisfy Curriculum requirements by enrolling in and passing Grade 10 Social

Studies, Grade 11 Psychology and Grade 12 Native Studies, or any other combination of courses of their choosing. This poses a particular challenge for social studies and history teachers, as they are required to cover a considerable amount of information in a short period of time. For example, a Grade 10 Native Studies teacher who is teaching students about Canadian Aboriginal history has approximately 85 hours (1 term) to teach students approximately 10,000 years of history. Inadequate time for effective course delivery, together with the possibility of disjointed and disconnected delivery of curricular content (which could be seen as a flaw in the design of the Saskatchewan Core Curriculum), have the potential to adversely affect a student's ability to gain adequate knowledge of any of the social science subjects they are required to study in high school.

2.3 Archaeology Education Resources in Saskatchewan

"Prior to your introductory unit, I had never had the time to locate, create or teach anything about archaeology before students went on their digging adventures [with the GAMAP]" (Ms. Jacks, personal correspondence 2004).

While there is a small collection of archaeology resources available through the Stewart Resources Centre (located at the Saskatchewan Teachers' Federation, Saskatoon), the review of the collections held at the libraries of the two schools participating in the research, as well those held at branches of the local public libraries, reveal that the majority of the archaeology-based resources available to teachers and members of the public focus on the ancient civilizations of Greece, Egypt, Mesoamerica, Asia and Mesopotamia, and include little or no content that describes North American or Northern Plains histories.

University of Saskatchewan Department of Archaeology and Anthropology graduate students (Fedorak 1994; Lodoen et al. 1994; Musser 1999; and Taylor-Hollings 1998a, 1998b) have conducted research and published articles that highlight the curricular connections and benefits possible through connecting archaeology and education. Fedorak's (1994) thesis, entitled *Is Archaeology Relevant? An Examination of the Roles of Archaeology in Education*, considered the relevance and role of archaeology to education, and involved the development and testing of the Wanuskewin Edu-Kit, and the *Archaeology in the Schools* project, content which was later expanded and included in *The Science of Archaeology, A Learning Guide*, (Lodoen et al. 1994). The latter two resources were designed to introduce scientific processes to middle years students through the introduction of a variety of archaeological activities and information about Aboriginal cultures and traditions. Musser's (1999) thesis, *Archaeology, Education and First Nations: Two Case Studies from Central Saskatchewan,* considered the development of archaeology education projects she was involved with through the GAMAP and the Eagle Creek Stone Circle Site project. Taylor-Hollings' two publications, *Results of the 1997 Crystal Beach Road Site Education and Public Archaeology Project* (1998a), and *A Second Public Archaeology Project at the Crystal Beach Road Site (EkNv-75): An Avonlea/Besant Campsite in Southwestern Saskatchewan* (1998b) describe projects undertaken in 1995 (1998b) and 1997 (1998a) at the Crystal Beach Road Site (EkNv-75) (located approximately 80 kilometres southwest of Saskatoon, at the Harris Sand Hills).

University of Saskatchewan, Department of Archaeology and Anthropology professors have published articles suitable for use in archaeology education, and have led

public archaeology field schools. Walker (1986) published "The Dig at Tipperary Creek" and Meyer (1985) published "Archaeology and the Nipawin Dam Project," in separate editions of Saskatchewan Education's *A Teacher Handbook for Division III and IV, A Fine Science.*

Rollans's (1990) publication, *A Handbook for Teaching Archaeology in Saskatchewan Schools,* may serve as a teaching resource for Saskatchewan educators who wish to integrate archaeological concepts and activities into required areas of study.

While the development of these resources meets the goals of increased public outreach by archaeologists, the locally-based nature of the content associated with these resources, and the timing of their creation—before the Saskatchewan Curriculum was revised—would require teachers who want to refer to and use these resources to spend a great deal of time reviewing, establishing curricular links, and adapting the activities and lessons so they can be used in the classroom. Such a task may be considered quite daunting, even for the most experienced teacher.

2.3.1 The Rise of Public Archaeology and Archaeology Education Initiatives in North America: The Ethical Responsibilities of Archaeologists

Decades before professional archaeologists issued a call for increased public outreach and education in archaeology, Judd (1929:406) wrote:

> During optimistic moments I have thought a concerted educational program on the part of anthropologists might suffice to create a public sentiment so intense and sincere as to guard from further spoliation ancient Indian remains either on private or other lands. But what a task that would be!

In an attempt to describe, discuss and capitalize on what was viewed as the rich potential that existed through the integration of anthropological concepts, themes and methods in formal educational programs, the American Anthropological Association

(AAA) has been involved in several public archaeology and education initiatives since the 1960s including the AAA Task Force on Teaching Anthropology, and the more recent AAA Anthropological Education Commission. Forty years of AAA involvement in anthropology education initiatives has allowed the organization to draw four conclusions about anthropology education: 1) whether or not they realize it, many teachers are integrating anthropological concepts and themes into their curricula; 2) there are many anthropology education programs in existence throughout North America—these initiatives need to be encouraged and rewarded; 3) teachers who teach with anthropology are energetic and charismatic—anthropologists should work with any and all teachers who break new ground by teaching with anthropology; and 4) teachers require training in basic anthropological concepts, themes and practices before they can teach with anthropology—anthropologists should lobby appropriate parties in order to ensure teachers receive proper training, information and support (electronic document available at http://www.aaanet.org/ committees/commissions/aec/ericksonarticle.htm).

While the work of Judd and the AAA played roles in initiating and facilitating discussion of public involvement in archaeological research, it was the work of Charles McGimsey III and William Lipe that laid the foundation for the establishment of a more public practice of archaeology in North America (Pokotylo 2002:88). McGimsey and Lipe's articles were published at a time when the discipline of archaeology was at a crossroads in the United States, as an increase in resources extraction, a rise in urban, suburban and rural land development, and the looting and destruction of archaeological sites by thieves and antiquities dealers was causing the destruction of archaeological sites and loss of the archaeological record on a massive and unprecedented scale.

McGimsey advocated the need to educate the public about cultural resources management and archaeology in his seminal work *Public Archeology*. He suggested that amateur and professional archaeologists were in the best position to take leadership roles in educating the many publics that existed about the relevance of archaeology and archaeological research, and he issued a call-to-arms to professional and avocational archaeologists to take on leadership roles in raising awareness among members of the public for the need to better preserve archaeological resources: "Archeologists, amateur and professional, cannot expect others to preserve the nation's heritage if we, who by interest or training are best qualified in the field, do not assume a role of positive leadership and public education" (1972:4). McGimsey (1972:6-7) also asserted that public support plays a major role in ensuring the future of archaeology:

> If there was ever a time when archeologists could afford to operate as in a vacuum it has long since passed. Without public support there cannot be legislative founding and funding of adequate programs to recover and protect a state's or the nation's archeological heritage.

Lipe (1974:215) wrote about the need to educate the public about archaeological resources and conservation in his now-classic paper Conservation Model for American Archaeology. This paper also included the suggestion that public education can and should play a major role in the conservation of archaeological resources. He challenged archaeologists "to take their heads out of their two-meter pits and become involved with the outside world."

In 1978, Emmanuel Kramer, another early advocate and pioneer of pre-collegiate archaeology education, described his hands-on, learning-by-doing approach to teaching with archaeology at the Society for Historical Archaeology's (SHA's) annual meeting held at San Antonio, Texas.

In 1988, the Public Relations Committee of the Society for American Archaeology (SAA) commissioned Gabriel DeCicco to write the article, A Public Relations Primer, which was published in *American Antiquity* (De Cicco 1988:840-856). His article describes how archaeologists can make more effective use of popular print media in public outreach.

In 1989, a session was held at the Chacmool conference in Calgary to discuss archaeology's responsibility to the public (Smith and Bender 2000). Also in 1989, delegates to the SAA's working conference, Save the Past for the Future, concluded that there were a number of North American archaeologists involved in public outreach through education (Friedman 2000:13), and that these archaeologists should support other archaeologists who were or were contemplating involvement in public outreach initiatives. This recognition led delegates to compile a list of public outreach-related tasks that they wished to accomplish before the next annual meeting (to be held in 1990). Topping the list were the creation of a standing committee and the establishment of an Action Plan to address issues related to public education and archaeology.

The 1990 SAA Conference, held in Las Vegas, saw the launch of the SAA's Public Education Committee (PEC). Two more SAA conferences were subsequently held: the first in 1992 in Greeley, Colorado, and the second in 1994 in Breckenridge, Colorado, which was called Save the Past for the Future II (a sequel to the 1989 Save the Past for the Future conference). Delegates at the Greeley conference evaluated recommendations and developments arising out of the 1989 Action Plan, while delegates at the Breckenridge conference identified and discussed issues related to K-12 education, and took elements from their and the Greeley conference to revise and finalize their

Strategic Plan, which was intended to guide the work of the PEC for the next five years (Friedman 2000:13-14).

Potter's (1990) article considered what constitutes effective public outreach in archaeology. This article was intended as a follow-up commentary to DeCicco's (1988) article, "A Public Relations Primer." Potter (1990:608) addressed "fundamental questions of *what* to say, and *why* to use public relations" in archaeological research and public outreach.

In his article entitled "The Many Publics for Archaeology," McManamon (1991:121) suggested that there exist several publics to which archaeologists are ethically responsible, including "the general public, students and teachers, legislators, public administrators, and Native Americans." He also asserted that public support plays a major role in ensuring the future of archaeology.

The SAA held additional workshops and conference throughout the 1990s to evaluate and discuss developments arising out of previous SAA conference directives. One such conference, *Teaching Archaeology in the 21st Century*, was held in 1998 at Wakulla Springs, Florida. Delegates to this conference identified the need for reform of undergraduate and graduate curricula to include materials on public outreach and public education. Conference delegates also established the PEC Workgroup as well as the SAA Task Force on Curriculum, which was mandated to consider relevant discussions and directives arising out of the 1998 and previous years' conferences (Friedman 2000:15). Other accomplishments of the PEC include establishing and funding a Manager of Public Education position at the SAA office, developing a plan for the management and continued growth of a PEC membership list, managing the web-based newsletter,

Archaeology and Public Education (1990) (electronic document available at http://www.saa.org/PubEdu/ A&PE/back.html), establishing the 1995 publication Teaching Archaeology, A Sampler for Grades 3 to 12 (electronic document available at http://www.saa.org/ PubEdu/A&PE/back.html), developing and maintaining a web page that includes a listing of educational and career resources (electronic document available at http://www.saa.hartstone.com/ resources/foredu.html), and organizing and sponsoring workshops developed specifically for Native American educators (Friedman 2000:15). Also according to Friedman (2000:16), the SAA's PEC initiatives have "herald[ed] a new dimension of the archaeological profession."

Following the lead of their American counterparts, the Canadian Archaeological Association (CAA), the Saskatchewan Archaeological Society (SAS), and the Saskatchewan Association of Professional Archaeologists (SAPA) have also included in their mandates the provision for increased public outreach and education.

Following is a description of three archaeological organizations that have demonstrated their commitment to public outreach in Canadian archaeology.

2.3.1.1 Canadian Archaeological Association (CAA)

Members of professional and avocational archaeological associations and societies recognize the ethical responsibility of public outreach and public involvement in archaeological research. As part of its Principles of Ethical Conduct (1997), the Canadian Archaeological Association established a national Public Outreach and Education Committee. Goals of this Committee include stewardship of archaeological resources, and the dissemination of archaeological knowledge to the general public by promoting "archaeology through education in the K-12 school systems" (electronic document

available at http://www.canadianarchaeology.com, accessed February 2003). (See the CAA website for a complete listing of CAA Public Outreach and Education Committee's mandates and goals.)

2.3.1.2 Saskatchewan Association of Professional Archaeologists (SAPA)

According to the Mission Statement of the Saskatchewan Association of Professional Archaeologists (SAPA):

> The goal of the Association, as a professional organization, is to facilitate the development of the archaeological profession within the province of Saskatchewan. The Association does this by ensuring that its members act in a responsible and ethical manner towards heritage resources and the members of the public that it serves (Saskatchewan Association of Professional Archaeologists 2006).

One of the ways that SAPA conducts public outreach is through making presentations at various public events in Saskatchewan (Kristen Enns-Cavanagh, personal communication 2005).

2.3.1.3 Saskatchewan Archaeological Society (SAS)

The goals of the Saskatchewan Archaeological Society (SAS) are, in part:

> … to educate individuals and agencies about the 10,000 years or more of Saskatchewan's human history and about the discipline of archaeology…to work collaboratively and cooperatively with other parties to the benefit of archaeological heritage…[and] to assist individuals, groups and agencies to be actively and responsibly engaged in research, preservation and educational efforts (Saskatchewan Archaeological Society Newsletter 2005:129).

The SAS's Education (Public) Committee holds annual archaeology field schools at pre- and post-European contact sites situated within close proximity to urban centres. In 2005, the Government of Saskatchewan designated June as Archaeology Month. In recognition of Archaeology Months in 2004 and 2005, the SAS Education (Public) Committee partnered with Wanuskewin Heritage Park to host Archaeology Day, which

included opportunities for children and adults to participate in a variety of archaeology-related activities including leaving their mark on the rock art wall, an atlatl throw (at a bison target), pottery making (according to traditional Northern Plains styles), a flintknapping (stone-tool making) demonstration, lithic (rock) and faunal (mostly bison bone) displays, and a tour of the Park's walking trails where participants were able to view an excavation in progress at the Dog Child site. The SAS also hosts annual summer field schools; there were two summer field schools held in 2005, one at the pre-contact Dog Child Site located at Wanuskewin Heritage Park, and one at the site of the post-contact South Branch House, located in rural Saskatchewan. The SAS has also developed teaching modules suitable for one-day workshops for older teens and adults covering a variety of topics including Introduction to Archaeology, Lithics and Archaeology, Geology and Archaeology, Identifying Saskatchewan Artifacts, and Ethnology and Archaeology. A second public outreach committee of the SAS, the Education (Schools) Committee, is in the process of developing teaching materials to accompany SAS artifact displays, and is also endeavouring to make the SAS Archaeo-Kits more accessible to Saskatchewan schools and teachers. (SAS Archaeo-Kits contain an assortment of genuine and replica artifacts associated with pre- and post-contact Northern Plains sites, as well as an accompanying artifact identification and description guide.) The SAS Education (Schools) Committee also stages events during *Archaeology Month*, and is considering developing an Archaeology Camp for pre-collegiate students (provided a suitable field school site can be located). Finally, a local chapter of the SAS, the Eagle Creek Historical Society, hosts an annual School Education Day at the Harris Museum (located at Harris,

Saskatchewan), which includes activities such as Aboriginal storytelling and walking tours of nearby heritage sites.

2.4 What North Americans Think About Including Archaeology in Pre-Collegiate Education

According to results from surveys conducted in North America between 1985 and 2001, members of the public support the inclusion of history and archaeology courses in elementary and high school curricula.

In Canada, Pokotylo and Mason (1991) conducted two surveys in 11 pre-selected neighbourhoods located in the greater Vancouver area in 1985 and 1989, with 550 questionnaires distributed through these two surveys (300 households in 1985 and 250 households in 1989). The purpose of the surveys was to collect data conveying respondents' understandings of prehistoric archaeology and how they viewed the conservation of archaeological resources. When asked at what level should archaeology courses be taught in schools, 55% of respondents answered at the elementary school level, while 31% answered at the high school level (Pokotylo and Mason 1991:14). Two percent of respondents answered that archaeology should not be taught in schools.

Pokotylo and Guppy (1999:405) conducted a survey in 1996, again in the greater Vancouver metropolitan area. Nine-hundred and sixty three households responded to the survey, which focussed on five questions: 1) knowledge of archaeology; 2) interest and participation in archaeology; 3) the role of archaeology in contemporary society; 4) awareness and support of heritage conservation initiatives; and 5) opinions regarding Aboriginal stewardship of the archaeological record. To the first question, 20% of respondents indicated they prefer to learn about archaeology in secondary school.

Pokotylo conducted a national survey in 2000 in order to learn more about Canadians' opinions on four topics: 1) archaeological knowledge; 2) interest and participation in archaeology; 3) awareness of and support for heritage and conservation programs; and 4) Aboriginal peoples' stewardship of the archaeological record. Seventy-eight percent of respondents agreed that archaeology should be taught in elementary schools, while an even higher percentage of respondents, 91%, agreed that archaeology should be taught in secondary schools (Pokotylo 2002:100).

The Federal Department of Canadian Heritage commissioned surveys in 2000 and 2001 to gain a better understanding of Canadians' opinions on historic archaeological sites. Of relevance to this research are the results of the 2000 survey (modelled after the 1999 survey done by Pokotylo and Guppy) regarding the relationship between archaeology and education: 78.4% of respondents expressed support for teaching archaeology in elementary schools, while 91.7% agreed that Canadian archaeology should be taught in secondary schools (Pokotylo 2002:100-101).

The SAA (2000) conducted a nationwide survey, Exploring Public Perceptions and Attitudes About Archaeology, to collect American's opinions on conservation, heritage and archaeological issues (electronic document available at http://www.saa.org/pubedu.nrptdraft4.pdf). Responses to questions about archaeology and education (2000:16-19) offer insight into how the American public views the relationship between archaeology and education, and indicate that people learn about archaeology through a variety of media. Ninety-nine percent of respondents reported that archaeological sites are of educational and scientific value. Fifty-six percent of respondents indicated they learned about archaeology through television, while 33%

listed magazines and 24% listed newspapers as their main sources of information about archaeology (2000:16). Twenty percent of respondents reported they learned about archaeology in high school, while 10% indicated they learned about archaeology in primary, elementary, or grammar school. Two percent of respondents reported that they learned about archaeology through participating in an excavation project (respondents were permitted to select more than one response to this question). Ninety percent of those surveyed indicated that archaeology should be taught as part of the regular school curriculum, 43% responded that students should start learning about archaeology in grades K through to 4, and 33% think that students should begin an archaeology education in the middle years grades (grades 5 to 8). According to the results of the SAA 2000 survey, there is a strong relationship between an interest in archaeology, and support for archaeology education and conservation of archaeological resources.

The Dominion Institute commissioned Ipsos-Reid to conduct a survey in 2001 in order to try to learn more about Canadians' views on history education. According to Wright (2000), 83% of the 1,002 respondents polled agreed that high school students should be required to take at least two Canadian history courses, while 73% agreed that testing for history and social studies courses should be mandatory for high school students (electronic document available at http://www.ipsos-na.com/news/pressrelease.cfm?id=1298).

In 2005, as part of their Passages to Canada programme to mark the International Day for the Elimination of Racial Discrimination, The Dominion Institute commissioned Ipsos-Reid to conduct a survey of 1,001 Canadians to learn more about their views on racial discrimination in their communities and workplaces. Thirty-two percent of

respondents listed *in schools* as the most effective way to promote racial tolerance (electronic document available at http://www.dominion.ca/ Downloads/IRracism Survey.pdf). Inclusion of archaeological concepts, themes and activities is one approach teachers may take to discuss multiculturalism in our society.

2.5 Societal Changes and Their Effects on the Transmission of Information in the Classroom

The field of education has experienced great change over the past five decades as regard learning theory, teaching methods and types of resources available to teachers. Prior to the 1970s, the practice of education stressed the external, outside world, and was more competitive in nature. Conformity was stressed in curricula and in the classroom. Subject segregation was emphasized to control what students learned, and to establish and entrench school and social policies (as well as political and economic policies). History teachers attempted to teach students all they thought they needed to learn—a body of content that would serve students for a long period of time. According to Davis (2005:25), "…traditional approaches to teaching the past tend to present historical information as a finished story with one correct version." This encouraged and supported conformist teachers and conformist students. It was only the exceptional teacher who encouraged and support students "to think outside the box."

Alvin Toffler (1980) describes society as being in the midst of a third wave of change. The first wave, agrarianism, arrived approximately 6000 years ago. The second wave, industrialization, rolled in to Europe during the 17th century. Industrialism was based on the premises of mass production, mass distribution and mass consumption, with people requiring information and training to cope with the economic and societal changes

that were occurring at that time. This led to young people who were labourers requiring training in order to work in the various industries this wave spawned. Hence, the learning curve showed signs of upward momentum during the second wave. As people and countries moved away from industrialization, the third wave, the information age, was ushered in. Technological advancements resulted in great diversification of economies and lifestyles, and the gap between knowledge, producers and consumers grew smaller as a result of technological advancements. In an effort to adapt to the changes affecting society since the 1950s, and in order that people could participate to a greater extent than ever before as producers and consumers of knowledge, greater numbers of people attended educational institutions for specialized technological training. One might be asking at this point, but what does this have to do with archaeology and education?

The 1950s, the end of the second-wave era, was a time of standardization and centralized bureaucracy, where the wheels of change churned slowly. Teachers of that time were under the impression that information was static, and that the content of school hardcover textbooks was to be valid and true for as long as students used them. Research conducted since the 1970s confirms that this approach was inadequate, and that there is value in establishing school policies and curricula that involve a more inclusive, integrated approach. Teachers have taken note of these developments, and have concluded that to teach is to be part of a dynamic continuum, with the transmission of information shifting from a hierarchical to inclusive approach. Teachers recognized and articulated their need to participate and contribute to processes that would renew and reinvigorate processes of curriculum development and delivery. The 1990s were a time of curriculum reform in Saskatchewan, resulting in the creation of the current Saskatchewan

Core Curriculum. The Core Curriculum includes policies, methods and resources to accommodate diversity of feelings, thoughts and experiences that are a part of today's classrooms. It also provides suggestions and supports to teachers who prefer to integrate new and different teaching approaches and resources into their classroom lessons.

With the arrival of the third wave, or the information age, a very different world took shape. Dynamic in nature, the third wave influenced great economic and societal change. Two examples of how the information age changed education include: 1) greater and quicker accessibility to new information via computers—soft information substituted for paper, rendering long-lasting, hard-cover textbooks outdated and unnecessary; and 2) with such easily accessible and up-to-date information available to the public, and the technology available to create and distribute updated versions of information now possible and affordable, a preference for soft-cover over hard-cover textbooks ensued. Soft-cover textbooks had a shelf life of approximately two years, and were much more useful to teachers than hardcover textbooks were.

Technological change was not the only phenomenon that influenced the scope and delivery of curriculum over the last few decades. Also occurring during the third wave was the development and discussion among members of various communities, including educators, of the cognitive development and sociocultural theories of Jean Piaget (Philips 1981) and Lev Vygotsky (Howe 1996; Vygotsky 1962).

Before the theories of Piaget and Vygotsky became relatively well known among educators and curriculum writers in North America, children were seen as passive, empty vessels waiting to be filled up with knowledge. Traditional views on cognition and learning did not consider that a student's ability to develop intellectually involves much

more than a teacher simply talking or lecturing and "getting [that information] into the heads of their students" (Bodner 1986:873). According to Davis (2005), designing curricula that involves students in the rote memorization of a concept does not guarantee that a student will grasp that concept. Educators now understand that traditional views on cognition and learning were not considering all the facts (Barakett and Cleghorn 2000:57-58).

Constructivism is based on the premise that students are not passive absorbers of information; rather, they are actively engaged in the construction of knowledge. Students are naturally equipped to be meaning-makers.

The works of Piaget and Vygotsky challenged long-held views held by teachers and curriculum developers that traditional approaches in the transmission of knowledge, such as lecture-style instruction and rote memorization, were the most effective modes of teaching students.

Teachers in Saskatchewan continue to face change at unprecedented rates. Affected by technological advances, as well as changing settlement and population growth patterns, it is necessary that teachers have access to appropriate teaching materials that support them in their attempts to deliver curricula in dynamic and meaningful ways, that challenge and stimulate all students enrolled in the systems. The job of teaching is becoming much more complex and demanding. Teaching with archaeology can assist teachers greatly in meeting the demands of the ever-changing classroom, as well as curricular goals and objectives.

2.6 Theories of Curriculum Development

Chapter 3 provides a detailed description of several publications that were reviewed as part of the coursework for this research, including Schwab's (1969) "The Practical: A Language for Curriculum," Anyon's (1980) "Social Class and the Hidden Curriculum of Work," Tyler's (1981) "Specific Approaches to Curriculum Development," Lyons's (1997) "The People's Curriculum: Henry Janzen and Curriculum Reform in Saskatchewan," Jackson's (1990) "The Daily Grind," Chamber's (1999) "A Topography for Canadian Curriculum Theory," and Robinson's (2006) "Curriculum Change in the 1980s: Directions and the Core Curriculum"). The topics and issues discussed in these publications provide a framework for the development and delivery of curricula in Saskatchewan, Canada and North America, offer insight into why it is necessary to challenge theoretical perspectives that have outlived their applicability, and reveal how issues pertaining to demographics, socio-economic status, and cognitive development and sociocultural theories come into play in the development and delivery of curricula.

Schwab's (1969) article, "The Practical: A Language for Curriculum," describes how, in the 1960s in the United States, those involved in curriculum development were reliant on archaic and ineffective theoretical perspectives. Schwab argued for the need to renew and revive a declining field of curriculum studies through thoughtful deliberation that incorporated theory with action.

Anyon's (1980) article, "Social Class and the Hidden Curriculum of Work," describes results of research she conducted from September 1978 to June 1979 involving Grade 5 classrooms at five schools located in contrasting social class communities (capitalist, middle class and worker) (1980:68-69). Anyon's research considered how

student/members of contrasting social class communities were groomed in the classroom by their teachers to occupy certain rungs on the social ladder in their adult years (capitalist, middle class and worker). The results confirmed that the students attending the schools located in more affluent communities received instruction that encouraged, facilitated and rewarded them for their independent and creative thinking, and prepared and assisted them to achieve their academic goals so they could pursue professional training and work in their chosen fields (lawyer, physician, engineer) as adults, and acquire physical and symbolic capital in a capitalist society. Whereas, the students attending the schools located in the inner-city and impoverished communities received instruction that was rote and mechanized in nature, required students to follow specific rules and steps, with offered them with few opportunities for independent or creative thinking or choices, thus preparing them for their presumed futures as members of the working class. It wasn't just a question of access to resources for the teachers and the students from the poorer communities—differences were also in evident in philosophies of education and teaching. Thus, we have evidence of the hidden curriculum, as Anyon suggests in her title.

In the article, "Specific Approaches to Curriculum Development," Tyler (1981) takes into consideration the nature and structure of knowledge, and discusses how the needs of the learner (cognitive, linguistic, social and moral development and vocational focus) must be balanced with the needs of society (interpersonal skills, literacy, vocational skills, social order, morality, transmission of culture, creativity and innovation).

Lyon's (1997) paper, "The People's Curriculum: Henry Janzen and Curriculum Reform in Saskatchewan," describes Janzen's involvement in grass roots, cooperative-based educational organizations in Saskatchewan such as the Home and School Association, as well as his membership and committee work with the newly-organized Saskatchewan Teachers' Federation (formed in 1934) which led to the newly-elected CCF government's Minister of Education, Woodrow Lloyd, selecting Janzen to become Saskatchewan's Director of Curriculum. Lyon's paper describes how Janzen's cooperative, consultative approach with government and non-government officials, as well as educators across the province, led to many successes in Saskatchewan education, not only in terms of curriculum development, but also in terms of how teachers viewed their responsibilities and roles in curriculum development.

Jackson's (1968) article, "The Daily Grind," describes the complexities and factors that are part and parcel of the everyday operation of a classroom, including the development and delivery of what he refers to as the *hidden curriculum*. Jackson suggests that the classroom is a highly stable environment in which a teacher may *redecorate* the classroom with elements of repetition, redundancy and ritual that permeates, dictates and directs the *hidden curriculum*. Jackson concludes that variables that affect student performance are rooted in the educational system moreso than they are a reflection of a teacher's training or values.

In "A Topography for Canadian Curriculum Theory," Chambers (1999) discusses dilemmas Canadian curriculum theorists face, such as how to represent the Canadian way of life (if in fact there is such a thing), from past, present and future perspectives, as well

as the challenges in trying to include the physical, imaginative and socio-political landscapes of Canada in the curricula they develop.

Robinson's (2006) article, "Curriculum Change in the 1980s: Directions and the Core Curriculum," discusses the processes and challenges that educators experienced in the 1970s as they worked towards developing a policy framework for curriculum development.

2.7 The Saskatchewan Core Curriculum

The Saskatchewan Core Curriculum

> is intended to provide all Saskatchewan students with an education that will serve them well regardless of their choices after leaving school. It reinforces the teaching of basic skills and introduces an expanded range of new skills to the curriculum (electronic document available at http://www.sasked.gov.sk.ca/docs/policy/core/intro.html, accessed October 27, 2002).

The Saskatchewan Core Curriculum serves as the framework adopted by professional educators in which all aspects of kindergarten to grade 12 education, including curricular content, instruction and assessment, are considered to function in a continuum, according to the stages of child growth and development.

Actualization of the Saskatchewan Core Curriculum involves a variety of partners in education, including parents, communities and individuals. Accessibility by teachers and educational partners to Core Curriculum guides and resources supports the actualization (or implementation) and continued renewal (represented by the term *Evergreen*) of the Saskatchewan Core Curriculum.

Teachers and partners in education work within the framework of the Saskatchewan Core Curriculum, the Components and Initiatives, which provide them with a multitude of methods and resources that they can utilize in order to achieve the nine goals of

education in Saskatchewan, which are to develop and enhance within students: 1) basic skills; 2) lifelong learning; 3) ability to understand and relate to others; 4) self-concept development; 5) positive life style; 6) spiritual development; 7) career and consumer decisions; 8) membership in society; and, 9) growing with change.

The Saskatchewan Core Curriculum includes 10 Principles: 1) Required Areas of Study, which includes English language arts, mathematics, science, social studies, health and physical education and arts education; 2) communications, numeracy, critical and creative thinking, technological literacy, personal and social values and skills and independent learning comprise the Common Essential Learnings (CELs); 3) Locally-determined Options which teachers may take advantage of through the integration of provincially- and locally-developed courses; 4) Adaptive Dimensions, which provide teachers with the option to adapt course materials in order to meet the diverse needs of all students; 5) Resource-based Learning, which includes teachers using a wide array of print, non-print, media, etc. materials in their teachings (archaeological sites, artifacts); 6) Indian and Métis Content and Perspectives which teachers are required to include in their teaching to foster in students an appreciation of Canada's cultural mosaic, produce a more culturally-relevant curriculum and to foster more meaningful learning experiences for all students, and encourage their support for universal human rights; 7) Gender Equity, so that all students are provided equal opportunities to learn; 8) Instruction and Evaluation, which provide teachers with a range of instructional approaches and evaluative techniques to disseminate information and evaluate students' academic performance; 9) Multicultural Education, which fosters increased understanding, acceptance, empathy and constructive and harmonious relations among people of

different cultures; and 10) Special Education, which supports programming which provides students with exceptional needs an opportunity to access the benefits of the core curriculum (electronic document available at http://www.sasked. gov.sk.ca/docs/policy/core/intro.html, accessed October 27, 2002).

2.7.1 Grade 6 Science

The main goal of Saskatchewan's K-12 science program is to develop scientific literacy in students. The Saskatchewan Core Curriculum identifies several Factors of Scientific Literacy that curriculum developers and teachers are directed to include in the development and delivery of curricula, including understanding change, reproducibility of results, classifying, observing and describing, measuring, inferring, communications, questioning, hypothesizing, predicting, interpreting data, using magnifying instruments, measuring time, respect for logic, valuing ecosystems, and more.

Five core units and three optional units comprise the Grade 6 Science curriculum. The core units are: 1) Chemicals and Reactions: the study of the composition, structure and properties of a wide variety of chemicals, and the identification of patterns and generalizations regarding chemicals and their reactions; 2) Earthquakes and Volcanoes: the study of the causes and effects of these two geological features; 3) Ecosystems: the study of the interdependence among the abiotic and biotic workings of the earth; 4) Exploring Space: the study of space exploration and the effects of technology on the development of space programs; and, 5) Energy In Our Lives: the study of various forms of energy and how they affect our lives. The optional units are: 1) Growth and Development: the study of invertebrate and vertebrate animals, as well as the changes that occur during the human life cycle; 2) Human Body Control Systems: the study of

the central nervous and endocrine systems; and 3) Earth's Climate: the study of theories related to long-term climatic change, as well as the identification of features of tropical, mid-latitude and polar regions.

The archaeology unit developed for Grade 6 Science teachers complements three core units: 1) Chemicals and Reactions; 2) Earthquakes and Volcanoes; and 3) Ecosystems, and the optional unit, the Earth's Climate.

According to Cameron (1995:38): "Native ways are rooted in a perception of the interconnectedness amongst all natural things, and all forms of life. Within this, the sense of the land is a central determining experience." Information about First Nations and Métis peoples, and their philosophies on and relationships with the environment and its resources, were also emphasized in the archaeology materials that were developed for the Grade 6 Science ecosystems core unit. The integration of Indian and Métis perspectives meets Curriculum requirements, and supports Ministry of Education policy, as described in the *Indian and Métis Education Policy from Kindergarten to Grade 12* (1995), "… that Indian and Métis peoples of the province are historically unique peoples occupying a unique and rightful place in society" (1995).

2.7.2 Grade 9 Social Studies

The objective of the kindergarten to grade 12 Social Studies program in Saskatchewan:

> is to help students know and appreciate the past, understand the present, influence the future and make connections between events and issues of the past, the present and the future. Further, its purpose is to make students aware that, just as contemporary events have been shaped by actions taken by people in the past, they have the opportunity to shape the future. The ultimate aim is to graduate students who have a sense of themselves as active participants in and citizens of an interdependent world (electronic document available at htttp://www.sasked.gov.sk.ca/docs/midlsoc/gr9/9overview.html, accessed October 25, 2002).

Grade 9 Social Studies:

> focuses on the many ways in which ancient cultures have influenced and contributed to the way of life in Canadian society…to understand the origins of specific customs and beliefs that exist within our society, how they have become engrained within our culture, and how they influence our actions and behaviours" (electronic document available at http://www.sasked.gov.sk.ca/docs/midlsoc/gr9/9overview.html, accessed October 25, 2002).

Four core units comprise the Grade 9 Social Studies curriculum: 1) Time, which informs students of the development of cultures and traditions; 2) Change, which involves students in the study of how changes in Europe affected Canadian society; 3) Causality, includes content that introduces students to specific historical events which have influenced and contributed to the Canadian way of life; and, 4) Culture: First Nations Roots, which focuses on the Aboriginal cultures of North America, and introduces issues to and involves students in discussions of past and current issues pertaining to Aboriginal peoples and their past and current ways so they (the students) can gain a better understanding of how past events, particularly since the time of European contact in the Northern Plains region, have affected and influenced Aboriginal peoples. The archaeology unit developed for Grade 9 Social Studies teachers complements two core units, 1) Time; and 2) Culture: First Nations Roots.

2.8 Constructivism and Its Relevance to Teaching With Archaeology

> "Teaching is enabling, knowledge is understanding, and learning is the active construction of subject matter" (Christensen et al. 1991:xii).

> "Learning about how people learn is probably the single most important thing an archaeology educator can do" (Smardz 2000:239).

Education is a well-established profession, with its own values, rules, language and methods (Smardz 2000:237). The same is true for professional archaeology. While most archaeologists are capable of preparing entry-level archaeological materials, and serving as guest speakers and guides, they are at a distinct disadvantage, compared to teachers and curriculum writers, when it comes to the development and delivery of curriculum-relevant educational materials, as they generally lack knowledge of cognitive and social development theories, and therefore face a relatively steep learning curve as they collaborate with curriculum developers and teachers in the development of appropriate archaeology education materials. It is therefore imperative for archaeology educators to gain a basic understanding of cognitive and social development theories.

From a child's viewpoint, the world is an interesting and fascinating place to explore and investigate. According to Lederman et al. (2004:40), "…students…actively construct their understandings of the world and these constructions are significantly influenced by prior knowledge, beliefs, attitudes, and experiences." Davis (2005:109) maintains that students must physically apply a concept in order to move beyond a basic understanding of a particular concept. Students construct knowledge by interacting in individual, physical and social environments. They discover knowledge through active processes of playing, experimenting, observing, comparing, communicating with their peers and teachers, asking and doing (in no specific order), and they learn best through active, hands-on learning activities. For them, learning is doing. Active learning involves students developing skills in observing, discussing, predicting, solving problems, writing, listening, reading, speaking and applying prior knowledge to new concepts. Thus,

children are scientists in their own right. Bona fide education seeks out and takes hold of the personal handles of students by engaging them in active learning situations.

Barakett and Cleghorn (2000:58) also assert that students bring their cultures into the classroom, and that the cultural capital of all children should find acknowledgement in the classroom. Cultural capital includes students' "home-based ways of perceiving, thinking, speaking, believing, and behaving" (Barakett and Cleghorn 2000:58).

In the article Constructivism: A Theory of Knowledge, Bodner (1986:874) writes:

> …learners *construct* understanding. They do not simply mirror and reflect what they are told or what they read. Learners look for meaning and will try to find regularity and order in the events of the world even in the absence of full or complete information.

Archaeology education promotes an active and structured experience that involves specific and ordered steps in the process, where students are free to consider, challenge and change what they already know (develop skills and gain knowledge) through interpretation, analyses and evaluation of the evidence before them. Through their involvement in archaeology education, students gain confidence through their own evidence-gathering and interpretive abilities, and they become further motivated to continue questioning and considering what they already know as they consider, analyze, consider some more, interpret, and apply meanings and draw new conclusions about something they are interested in learning more about.

Recognition of the relevance of constructivism to teaching with archaeology has influenced many archaeology educators (Brown et al. 1989; Dale 2000; Davis 2005; Gallavan 2001; Howe 1996; Johnson 2000; Novak 1993; Onderdonk 1986; Smardz 2000; and Willis 2000) to adopt constructivism in the design and delivery of their own teaching

materials. Educators also recognize the relevance of constructivism to curriculum development.

2.8.1 Jean Piaget's Cognitive Constructivism: Cognitive Development Is Rooted In Internal Processes

Piaget's cognitive constructivism maintains that the main impetus for cognitive development is internal, and involves the child playing an active role in his/her own cognitive development (McVittie 2001). According to Piagetian theory, the "mechanisms for [cognitive] development reside within the child; meaning comes from the individual and logical thinking; and learning is a purely mental process" (McVittie 2001) which involves discovery and concept-building among children.

For Piaget, cognitive development depends on interactions of various behavioural factors that occur in four successive stages: 1) maturation; 2) experience; 3) social transmission; and 4) equilibrium. Piaget's theory on cognitive development suggests that, as the physical body matures, so too does the mind. This occurs in four invariant, universal stages (ages are approximate, and vary by stage, depending on the source cited): 1) sensorimotor: in which intelligence takes the form of motor actions (occurs between the ages birth and two years); 2) preoperational: intelligence is intuitive in nature (occurs between the ages two to seven years); 3) concrete operations: logic comes into play at this third stage, but depends upon concrete referents (occurs between the ages of seven to eleven years); and, 4) formal operations: thinking involves abstractions (occurs between the ages eleven to twenty years). What results is an inter-play of advancing biology leading to increased cognitive development, which, in turn, propels the child towards more complex reasoning abilities and the next stage of cognitive

development.

Piaget's learning theory and processes of cognitive development are relevant to processes associated with archaeology education. As regards designing archaeology education materials, and taking into consideration Piaget's theory of cognitive development, "instead of merely trying to impart information, the teacher should consider designing experiences that allow the student to actively structure the subject being taught, by questioning, experimenting, and discovering facts and relationships among them (Onderdonk 1986:80). For example, taking into consideration Piaget's four stages of cognitive development and the design of archaeology education materials, for the Grade 6 Science students (who are presumably at stage 3 of Piaget's universal stages of cognitive development), the inclusion of concrete operations in curricula promotes logical thinking. Lessons involving activities and concepts of classification and relations, spatial relationships, time, movement, conservation, and measurement also come into play at this third stage. The use of artifacts is also complementary to this stage of cognitive growth. As it regards Piagetian theory and Grade 9 Social Studies students, (who are presumably at stage 4, formal operations), this stage involves abstract thinking. At each of the four stages, students gain confidence in the process, and are further motivated to continue questioning, analyzing and interpreting (reflective thinking). This being the case, Piaget's theory on cognitive development was considered complementary to and therefore influenced the design of the archaeology resources developed and delivered in the research.

2.8.2 Lev Vygotsky's Social Constructivism: Meaning-Making Is Rooted In the External World

"Tell me and I forget, teach me and I remember, involve me and I learn."

(Benjamin Franklin, undated, accessed September 2003, http://www.quotiki.com/ quote.aspx?id=10324).

Vygotsky's social constructivism maintains that the impetus for meaning-making is rooted in the external world, and is part of a social system that is set into motion as a result of verbal interactions with other people (McVittie 2001). Meaning-centred learning motivates and supports students to move past being passive recipients of information, and onto becoming meaning-makers. A student's ability to acquire information involves a process whereby an *expert* (such as a teacher) uses language to interact with, guide and direct (in a scaffold-like process) the *novice* (a student) in making personal connections with the subject at hand. This type of exchange between the *expert* and the *novice* is how Vygotsky suggests people learn most effectively. In this process, learners are involved in the active construction of knowledge, and, in the process, validate prior knowledge and experiences (Bodner 1986:873-878) through the connections they make between previously understood and new information, taking students beyond what they can accomplish independently, to what he/she can accomplish with assistance or under guided discovery (the zone of proximal development). This being the case, Vygotskian theory, social constructivism, was considered complementary to and therefore influenced the design of the archaeology resources developed and delivered in the research.

2.9 Situating Cognitive Development: Learning and Context Are Inextricably Linked

> In the traditional classroom there has often been a separation between knowing and doing, that is, knowledge is often treated as a separate entity from the situation in which it is learned…. Learning and cognition are situated; the 'how' is as important as the 'what'…. The contexts in which learning occurs are therefore integral to what is learned (Dale 2000:1).

Archaeologists and educators have advanced the argument that learning and the context (the activity or situation) within which it occurs are inextricably linked, and that the context within which learning occurs can affect the potential and outcome of the learning experience.

This notion challenges the efficacy of long-standing structures and practices of educational systems by suggesting that they are rooted in the assumption that knowledge is a separate and self-sufficient substance from the situation or context within which it is acquired.

In their article, "Situated Cognition and the Culture of Learning," Brown et al. (1989:32) echo Dale's assertion regarding the inherent connectedness of learning and the context in which learning occurs, and goes on to describe the negative repercussions that may result through practices that do not take into consideration this phenomenon. According to Brown et al. (1989:32), "activity and situations are integral to cognition and learning…by ignoring the situated nature of cognition, education defeats its own goal of providing useable, robust knowledge."

The integrated nature of cognitive growth and learning is also discussed by Miller and Gildea (1987:94-99).

In their article, **"**The Craft of Archeology," Shanks and McGuire (1996:75) argue:

> The idea of archaeology as craft challenges the separation of reasoning and execution that characterizes the field today…we propose a unified practice of hand, heart, and mind for archaeology…[and] we wish to consider archaeology as a mode of cultural production, a unified method practiced by archaeologists, 'client' public, and contemporary society.

Shanks and McGuire emphasize the highly contextual and situated nature of archaeological practice. By seeing the practice of archaeology as a craft (as Shanks and McGuire have challenged archaeologists do to), professionals are able to enhance and edify its practice and interpretation. Their views on the impact that the mind, hand and heart have on archaeological investigation and interpretation are complementary to constructivist approaches in teaching, and to the cognitive development and sociocultural theories of Piaget and Vygotsky.

Chapter 3 provides an overview of the literature reviewed during the research, including publications relevant to the theories of Piaget and Vygotsky.

3. Review of the Literature

Nine subject areas were focussed on during the review of the literature: 1) the ethical responsibilities of archaeologists; 2) archaeology education initiatives in North America; 3) what North Americans think about including archaeology in pre-collegiate courses; 4) the different cultures of archaeologists and educators; 5) theories of curriculum development; 6) the Saskatchewan Core Curriculum, specifically Grade 6 Science and Grade 9 Social Studies; 7) the relevance of Piaget's cognitive constructivist/cognitive development theory to archaeology education; 8) the relevance of Vygotsky's social constructivist/ sociocultural theory to archaeology education; and, 9) the use of simulated sites in archaeology education.

The publication dates of the literature reviewed span five decades, 1960 to 2000. While some of these publications may be relatively dated, they are significant contributions in the field of archaeology and education, and therefore were considered appropriate for inclusion in the review of the literature.

3.1 The Ethical Responsibilities of Archaeologists

> While it will always be true that archeologists need to communicate effectively among themselves, it now is abundantly clear that unless they also communicate effectively with the general public, and with those making decisions affecting the cultural resource base, all else will be wasted effort (McGimsey and Davis l977:89).

Several publications that include discussions about increased public outreach, involvement and interpretation in archaeological research were reviewed, including the

work of Danien (1996), Fagan (1994), Gelburd (1990), Green et al. (2003), Herscher (1989), Jameson (1994a, 1994b), Jeppson (2000, 2001, 2003), Joukowsky (1991), King (1983), Lipe (1974), McGimsey (1972), McGuire (2003), Osborn (1994), Poirier and Feder (1995), Roberts (1995), Smardz (2000), Smardz Frost (2004), Smith and Ehrenhard (2001), Young (2003), Zimmerman et al. (2003).

The authors whose works are cited above contend that an informed and active public demonstrates greater support for archaeological research, and for the conservation and preservation of heritage resources, and are valuable sources of volunteer, political and economic support to archaeologists who are involved in public outreach initiatives.

In his paper Professional Responsibility in Public Archaeology, King (1983:145) poses the question: "To whom are public archaeologists responsible?" After considerable reflection on the question, King suggests archaeologists are responsible to: 1) the resource base, the archaeological sites; 2) companions-in-arms, our archaeology colleagues; 3) research, the advancement of scholarship; 4) clients, those who pay for the work done (governments, private and public sector companies, etc.); 5) the law, legislative and contractual obligations; and 6) the living, non-archaeologists who are interested in archaeological sites and research. King (1983:146, 143) finds the term *public archaeology* "amorphous" and "inclusive" and difficult to define.

McGuire (2003:ix) contends that professional archaeologists have three obligations: 1) to the archaeological record itself, 2) to a variety of publics, most notably descendent communities, and 3) to each other [archaeologists] as professionals.

In his Draft Paper on Public Archaeology entitled "A Brighter Future for Public Archaeology," Tippett (1996:no page number) suggests that archaeologists need to shift their thinking to become

> …more responsive to constituent needs: First, we will have to revisit the philosophical basis of public archaeology. Too many professionals are caught up in a world view that places archaeology on the highest plane of human achievement. We need to…realize that archaeology is tangential to the necessities of everyday life ….In too many cases, our world view blinds us to the fact that public archaeology is embedded in a matrix of community concerns about the environment, economic development, and social justice.

Jameson (1994b:17) suggests that unless archaeologists present the results of archaeological research in a way that is understandable and relevant to the public, the end result of archaeological research "is ultimately an empty endeavour." Jameson (1994b:17) also argues that while it is important for archaeologists to communicate with one another, public interpretation is an important part of archaeological practice. Jameson (1994b:17) and Roberts (1995:1) contend that legally-accepted standards for cultural resources management should include, as an end-product, public education and outreach, and provide some orientation describing results of archaeological investigations to the public. They also suggest that in order for this to occur, data recovery projects involving public outreach will require adequate funding to cover associated costs.

Ucko's (1995) book, *Theory in Archaeology, A World Perspective*, describes theoretical developments in 20th-century archaeological practice in Canada. Mackie's (1995:188, 190) paper, "Prehistory in A Multicultural State, A Commentary on the Multicultural State," provides an overview of the theoretical developments in Canadian archaeology, describes the influences of American theory and practice on Canadian archaeology, provides a description of the challenges faced and opportunities presented to

archaeologists working in a "new social reality" that includes Aboriginal peoples' involvement and decision-making in archaeological research, and discusses how Canadian archaeology may benefit from greater contact with and input from archaeologists working outside North America.

In his paper, Public Education, A Part of Archaeological Professionalism, McManoman (2000:20) contends that, in addition to providing interpretive information, it is also necessary that archaeologists provide the public with an explanation of how they constructed their interpretation "so that the informed public understand not only the past, but also its use in the present."

In their paper, "Indigenous Knowledge and Archaeological Science: The Challenges of Public Archaeology in the Reserva Uaçá" Green et al. (2003:366) assert that archaeologists must work participatively with communities associated with their research, provide them with information and include them in activities that will draw their attention to the importance of the conservation of heritage resources.

In *The Ethics of Collecting Cultural Property*, Messenger (1999) considers archaeologists' professional responsibilities as they relate to the excavation, collection, sale, ownership and repatriation of cultural property. Messenger suggests that public outreach and education efforts have and will continue to increase public awareness, about the need to protect cultural resources from improper exploitation and destruction. Messenger also suggests that public education programs should emphasize and target contact with young people. According to Messenger (1999:xv), "Children who are excited about what they can learn from the past grow up to be citizens and taxpayers who are more likely to support preservation laws, both domestic and international." In the

Foreward of Messenger's publication, Fagan (1999:xx) writes, "…the future of the past lies not only in archaeologists', but everyone's hands…. If we continue, intellectually ostrich-like, on our present course, there is no future for the past."

Papers written by Ledbetter (1999) (describing the work of Isabel Garrard Patterson), Sullivan (1999) (describing the work of Madeline D. Knebert Lewis), Davis (1999) (describing the work of Bettye J. Broyles), and White (1999) describing the contributions made by Yulee W. Lazarus, Hester A. Davis and Martha Ann Rolingson), were also reviewed during the course of the research.

Grit-Tempered, Early Women Archaeologists in the Southeastern United States (Davis 1999) includes descriptions of the work of archaeologists who are considered pioneers by their peers because of their early recognition of the benefits that can be accrued through involving the public in archaeological research.

3.2 Archaeology Education Initiatives In North America

The last three decades have seen a marked increase in the development of public archaeology materials and programs in North America. This section describes a number of these initiatives.

Osterweis Selig's (2000) article, "Brokering Cultures: Archaeologists Reach Out to Teachers," includes an extensive listing of educational and anthropological/ archaeological organizations, publications and resources. It is recommended reading for archaeologists who wish to learn more about what is involved in teaching with archaeology.

In the foreword of the publication *Presenting Archaeology to the Public: Digging for Truths,* Jameson (1997:9) writes: "How we involve the public in the rich fabric of the

American experience is one of our great challenges as we enter the 21st century." This publication is comprised of several case studies that describe public outreach programs, training sessions, workshops and academic symposia associated with the Southeast Archaeological Center's Technical Assistance and Partnerships Division's Public Interpretation Initiative, which began in 1990. This publication may serve as a guide on how to conduct successful public archaeology education programs.

In *Bringing Back The Past, Historical Perspectives on Canadian Archaeology*, Killan's (1998) paper entitled Toward a Scientific Archaeology: Daniel Wilson, David Bole and the Canadian Institute 1852-96, describe people and institutions that played key roles in the development of Canadian archaeology.

Chapter 8 of Kehoe's (1998) *The Land of Prehistory, A Critical History of American Archaeology* describes the factors and political forces that influenced and led to the formation of the Society for American Archaeology (SAA) Public Education Committee (PEC), and describes how, since its formation in 1990, the PEC has influenced archaeologists and archaeological societies to become more involved in public outreach and archaeology education programming. (as previously discussed in this thesis chapter).

Contents of the Mississippi Valley Archaeology Center (MVAC) website (2000), (electronic document available at http://www.uwlax.edu/mvac), was also reviewed. The MVAC, associated with the University of Wisconsin at La Crosse, has been in operation since 1982. Its primary goal is to offer public programs that provide information about the science of archaeology, and about the history of the upper Mississippi River area. The MVAC website also provides access to *MVAC Education,* a digitally-formatted, on-line

archaeology education newsletter that includes lesson plans and other resources that teachers can adapt and integrate into existing curricula.

In Saskatchewan, public acknowledgement of the benefits of connecting archaeology and pre-collegiate education is a relatively new trend. University of Saskatchewan Department of Archaeology and Anthropology graduates Fedorak (1994), Musser (1999) and Taylor-Hollings (1998a, 1998b) have conducted research and authored publications that describe the connections that exist among archaeology and education. Fedorak's (1994) thesis*, Is Archaeology Relevant? An Examination of the Roles of Archaeology in Education*, considers the relevance and role of archaeology to education, and involved the development and implementation of: 1) the Wanuskewin Edu-Kit, which was "a synthesis of First Nations' cultures and archaeological methods and techniques [which were offered] through educationally valid activities" at Wanuskewin Heritage Park (Fedorak 1994:89); and, 2) the Archaeology in the Schools program, which consisted of eight teaching modules that Fedorak co-developed with University of Saskatchewan, Department of Archaeology and Anthropology student Lodoen in 1993 (this publication was later expanded to 10 modules, and included in *The Science of Archaeology, A Learning Guide*, Lodoen et al. 1994). These modules were designed to introduce scientific processes to middle years students through the introduction of a variety of archaeological concepts, themes and activities

Musser's (1999) thesis, *Archaeology, Education and First Nations: Two Case Studies from Central Saskatchewan,* considers the development of archaeology education projects that lead to "comprehensive, meaningful and enjoyable" (1999:ii) learning experiences for participants. Musser's thesis involved projects done with the Grace Adam

Metawewinihk Archaeological Project (GAMAP), and at the Eagle Creek Stone Circle site.

Taylor-Hollings' two publications, Results of the 1997 Crystal Beach Road Site Education and Public Archaeology Project (1998a), and *A Second Public Archaeology Project at the Crystal Beach Road Site (EkNv-75): An Avonlea/Besant Campsite in Southwestern Saskatchewan* (1998b), were reviewed in order to learn more about archaeology education projects undertaken in Saskatchewan. These reports describe projects undertaken in 1995 (1998b) and 1997 (1998a) by Taylor-Hollings, Western Heritage Services Inc., and members of the Eagle Creek Historical Society at the Crystal Beach Road Site (EkNv-75) (located approximately 80 kilometres southwest of Saskatoon, at the Harris Sand Hills). Teachers and high school students from six local Saskatchewan communities, Harris, Tessier, Perdue, Rosetown, Plenty, and Milden, participated in the 1995 and 1997 fieldwork sessions.

University of Saskatchewan, Department of Archaeology and Anthropology professors Foley, Kennedy, Meyer and Walker have authored and co-authored archaeology education resources and have collaborated with the Saskatoon School Board, and Saskatchewan and Saskatoon Archaeological Societies in the creation and supervision of public field schools held at different archaeological sites in Saskatchewan.

Rollans (1990) *A Handbook for Teaching Archaeology in Saskatchewan School* is a teaching resource available to Saskatchewan educators who wish to integrate archaeological concepts into a variety of required areas of study. While this publication does include useful information on basic archaeological methods, an overview of the pre- and post-contact periods of Saskatchewan archaeology, a discussion of careers in

archaeology, a focus on the Bushfield West site near Nipawin, Saskatchewan, a section including classroom and outdoor activities, and a listing of resource materials available to educators, this was written during the period the Saskatchewan curriculum was undergoing major revision, making it necessary for teachers to adapt and define curricular links between it and the Core Curriculum.

As part of the Principles of Ethical Conduct (1997), the Canadian Archaeological Association (CAA) has convened a national Public Outreach and Education Committee. Stewardship of archaeological resources, and the dissemination of archaeological knowledge to the general public are among the commitments of this Committee. There are many recommendations made by the CAA Committee on how to achieve these goals, including to "promote archaeology through education in the K-12 school systems" (electronic document available at http://www.canadianarchaeology.com for a complete listing of the recommendations of the CAA Public Outreach and Education Committee). Mandates of the Canadian Archaeological Association, the Saskatchewan Archaeological Society, the Saskatchewan Association for Professional Archaeologists hold that, in addition to the conservation, recovery and curation of the archaeological record, professional archaeologists should also inform and collaborate with the diverse publics that exist (such as private and public sector organizations, teachers and students). Objectives of the CAA include: 1) to promote the increase and the dissemination of archaeological knowledge in Canada; 2) to promote active discourse and cooperation among archaeological societies and agencies and encourage archaeological research and conservation efforts; 3) to foster cooperative endeavours with aboriginal groups and agencies concerned with First Peoples' heritage of Canada; 4) to serve as the national

association capable of promoting activities advantageous to archaeology and discouraging activities detrimental to archaeology; 5) to publish archaeological literature; and, 6) to stimulate the interest of the general public in archaeology.

Discovering Archaeology: An Activity Book for Young Nova Scotians (Boutilier et al. 1992) was published by the Nova Scotia Archaeology Society through funding provided by the Government of Canada's Department of Communications Access to Archaeology Programme. This well-illustrated activity book describes a variety of pre- and post-contact archaeological sites in Nova Scotia, including the Grassy Island National Historic Site. The activities included in this publication could be adapted for use in elementary grades curricula.

Parks Canada is also involved in public education through archaeology, and have partnered with Nova Scotia's Grassy Island National Historic Site in the development of *Discovering Our Past – Through History and Archaeology, Teacher's Guide* (1993). This Guide includes unit plans that meet Nova Scotia's Social Studies curriculum for Grades 4, 6 and 7. Parks Canada has also developed two lesson plans that are relevant to Grade 11 Canadian History courses in Nova Scotia (Denise Hansen, personal communication 2006), and includes on their website a link to the interactive activities, Our Roots, Our Future, and We Live, Who We Are, which includes archaeology themes (Parks Canada 2006). A partnership among Parks Canada, the Virtual Teachers Centre, and the Newfoundland and Labrador Teachers' Association has led to the creation of a Grade 3 Social Studies lesson plan, Past to Present, which focuses on L'Anse aux Meadows National Historic Site, and makes use of the history and artifacts of this site to connect students with their local history (Virtual Teacher Centre 2006). Parks Canada has

partnered with the Grande-Pré National Historic Site in the development of a website that includes a virtual excavation and archaeology activities relevant to the site (Grande-Pré National Historic Site 2006), and has partnered with St. Mary's University the past four summers to facilitate the running of the Grande-Pré Archaeology Field School (run by Jonathan Fowler, a landscape archaeologist and teacher) (Denise Hansen, personal communication 2006). Parks Canada is also currently partnering with the Port-la-Joye – Fort Amherst National Historic Site in the development of a web-based lesson with archaeology themes (Denise Hansen, personal communication 2006).

The Schoolnet Digital Collections Program (in partnership with Industry Canada) entitled Archaeology: A Step Back In Time, The Grassy Island Experience, includes the history, a gallery of images, and a Kid's Centre web page, Arch"kid"ology that includes age-specific archaeology activities relevant to the history of the Grassy Island National Historic site (Schoolnet Digital Collections Program 2006)

The Archaeology Education Handbook (Smardz and Smith 2000) describes the internationally-acclaimed archaeology education pilot project, The Archaeological Resource Centre (ARC), which operated between 1984 and 1993 in the greater Toronto area. Under the leadership of Smardz (2000:236) and other professional archaeologists, the ARC received funding from the Toronto Board of Education, and provided information to more than 10,000 school children and public participants every year about the history of downtown Toronto through an archaeology education program involving fieldwork that was conducted at the Thornton and Lucie Blackburn fugitive slave homestead. The ARC ceased operation in 1993, one of many program casualties that

resulted due to provincial government reorganizing and cutbacks. According to Smardz and Smith, the ARC fell victim to its own successes:

> It [ARC] got more publicity than all other school programs combined, so it was a good demonstration piece when budget cuts came around. Logic at the board's executive level held that the public would notice that the board was downsizing if it cut its highest-profile public program.

The Archaeology Education Handbook (Smardz and Smith 2000) includes papers discussing a wide range of topics related to archaeology education, including the culture of teaching in Canada and the United States, how to access educational systems in Canada and the United States, cognitive and moral development among school-aged children, a teacher's journal describing her foray into archaeology education, integrating magazines and other forms of resources into archaeology education, the pros and cons of excavation at a simulated site, how to establish and maintain positive working relationships between archaeologists and educators, the relevance of museum education, heritage education for special needs students, the use of magazines and technology in archaeology education, and the use of simulated sites in archaeology education, and descriptions of successful archaeology education programs in operation in North America. This book is considered essential reading for anyone interested in archaeology education.

An Action Research Report: Connecting Wanuskewin and Saskatchewan Schools, written by Smith and Robinson (2000) was also reviewed. The overriding question this publication poses is: What needs to be done to increase school group visitorship to Wanuskewin Heritage Park, and assist the Park in better fulfilling its educational mandate? According to the results of Smith and Robinson's research, increased and stronger connections could be established between Saskatchewan schools and

Wanuskewin Heritage Park through the creation of a handbook designed specifically for elementary teachers who are planning to bring their students to the Park. This handbook, *Connecting Wanuskewin and Saskatchewan Schools* is available electronically at www.usask.ca/education/wanuskewin, and is also available for loan through the Stewart Resources Centre (Saskatchewan Teachers' Federation, Saskatoon). This pre-visit handbook presents information about the Park, including a section on the archaeological history of the Park.

The paper "Broken Bottles and Bison Bones: Public Archaeology at Fish Creek Provincial Park, Calgary, Alberta" (Boland et al. 2001) (presented at the 33rd Annual Meeting of the Canadian Archaeological Association in 2001) was also reviewed. The Discover Archaeology public archaeology program was established at Fish Creek Provincial Park between the University of Calgary's Department of Archaeology and the Government of Alberta's Community Development. The Discover Archaeology program includes hands-on, Alberta curriculum-based programs designed to meet curricular objectives for kindergarten to Grade six social studies and science. As of March 2008, there is some question as to whether the Discover Archaeology program will have adequate funding to continue operating.

Digging Deep, Teaching Social Studies Through the Study of Archaeology (Wolf et al .1997) discusses the culture of teaching, offers suggestions on how archaeology educators should work with teachers, and describes methods and tools available to teachers covering Native American lifeways, and Mayan and Greek civilizations.

Chapter 6 of the book *At A Crossroads: Archaeology and First Peoples in Canada*, "Education and Empowerment: Archaeology With, For, and By the Shuswap Nation,

British Columbia," considers the roles that education and research play in cultural resources management programs conducted on Aboriginal lands, and also looks at the educational program involving the Shuswap Nation of Kamloops, British Columbia. Nicholas writes: "Education is an important area of CRM often overlooked, yet it addresses many of long-term programs [sic] that resource managers face, particularly those relating to site preservation and evaluation of site significance" (1997:86).

The Department of Anthropology at St. Mary's University in Nova Scotia published *Teaching Anthropology Newsletter* from 1981 to 2001. This publication served readers interested in teaching pre-collegiate anthropology and archaeology.

AnthroNotes, a Smithsonian Institute initiative, was first published in 1979, and continues to be published. Published biannually, this newsletter includes a regular feature, Teacher's Corner, which provides archaeology educators with professional development and teaching materials applicable and adaptable to classroom archaeology education. One such article, Archaeology for the Classroom, includes a paper written by Ashmore and Baumann (2003). This paper describes a collaboration involving faculty, graduate and undergraduate students from the University of Missouri's Division of Teaching and Learning and the Anthropology Department, which led to the development of a pre-collegiate anthropology program, including an archaeology component. The Society for American Archaeology publishes *Archaeology for the Public* (electronic document available at http://www.saa.org/public/home/home.html), which is designed to provide the public with a wide range of information, including notices of new and upcoming events such as public meetings, workshops and field schools, a listing of resources suitable for those interested in archaeology and in teaching with archaeology,

interactive activities for students of all ages, as well as links to other web sites that may be of interest to the public. The SAA also published *Archaeology and Public Education* until 2004, and makes back issues available for purchase or print at the following link: http://www.saa.org/PubEdu/ A&PE/back.html. The M.A.T.R.I.X (Making Archaeology Teaching Relevant in the XXI Century) project is another SAA initiative. The M.A.T.R.I.X. provides resources for professors and instructors at the university undergraduate level, as well as recommendations for specialized training for undergraduate and graduate students who are interested in learning more about public outreach through education.

Sleuthing Through History: An Introduction to Archaeology (Neuman and Thompson 1983) includes activities suitable for high school students. While there are some worthwhile activities in this publication, such as the preservation chart and corresponding activity, its use of the analogy, archaeologist as detective, as the context for the activities is considered unsuitable for current practitioners of archaeology education as it promotes a stereotypical image of its practitioners.

Developed as part of The University of Georgia's Anthropology Curriculum Project, *Archeology and Education: A Successful Combination for Precollegiate Students* (Holm and Higgins 1985) includes papers addressing the value of archaeology to enhance the delivery of science, math and social sciences curricula to middle years and high school students.

Classroom Archaeology: An Archaeology Activity Guide for Teachers (Hawkins 1991) provides descriptions of archaeological sites located throughout Louisiana. The

activities included in this publication may be adapted and integrated into elementary and high school curricula.

Another publication that focuses on the archaeology of Louisiana, *Adventures in Classroom Archaeology* (Nobles 1992), includes archaeology-based lesson plans for grades K to 12 that cover a wide range of topics including excavation methods, Louisiana history, biology, chemistry, earth and environmental sciences.

Windows on the Past (Peturson and Shields, 1997) includes eight Learning Events covering a wide range of themes and activities, including the Piegan-Blackfoot people, creating a time line of past events, examining writing systems and creating a writing system, excavating at an imaginary site, reconstructing a pottery vessel and recording observations in the process, and more. While this publication includes Canadian content, its authors did not specify which age or grade the activities are suited to, making it necessary for those interested in using it to confirm its utility by spend a good amount of time perusing the document to establish curricular links where they exist. A review of this publication by the researcher confirms the lessons are suited to middle years curricula.

*Digging Deep: Teaching Social Studies Through the Study of Archaeology (*Wolf et al. 1997) consists of case studies written by middle-years social studies teachers from across the United States who described their classroom experiences as they integrated the questions and tools of archaeology to teach about world history and cultural diversity. This publication, like most of the others reviewed during the course of the research, focuses on cultural groups originating outside of Canada.

Rice's (1998) *Doing Archaeology: A Hands-On Laboratory Manual* includes 13

hands-on activities that are designed to introduce students to the scientific study of archaeology. Like the authors of *Windows on the Past*, Rice does not specify which age or grade levels the activities included in this publication are suited to. A review of this publication by the researcher confirms the lessons are better suited to high school courses.

Dale's (2000) article, "Situating Archaeology Education: The Relevance of socio-Cultural Theory in Developing Public Archaeology Programs," discusses the relevance of sociocultural theory to the development of public archaeology programs.

The paper written by Pretty (2000), "Facts and Skills: Archaeology in Teaching Training," provides suggestions for professional development for teachers interested in using archaeological resources in their lessons.

GAMAP Interim Reports covering 1995 to 2004 field seasons were also reviewed.

Teaching Archaeology in the Twenty-First Century (Bender and Smith 2000) includes papers covering a wide variety of topics, and argues that university archaeology courses should go beyond the teaching concepts, themes and methods, and include instruction and training that provides students with the knowledge and skills required to effectively communicate information about the past with the many publics that are interested in learning more about their own and other communities.

In *Cultural Resources Archaeology, An Introduction*, Neumann and Sanford (2001:170) discuss the importance of planning for and including public involvement in cultural resources management. They suggest that cultural resources management "does not just require sound local contacts and good public relations, it can greatly benefit from such efforts."

Carman's (2001) *Archaeology and Heritage: An Introduction* considers how people think about and understand heritage through sites, buildings and other structures. Carman looks at factors that influence how individuals consider and categorize cultural remains. Carman brings in several case studies to consider the term public archaeology (which he argues is an ambiguous term used broadly) to define the various publics involved in public archaeology, and to discuss and describe how and why we might engage different publics in archaeological investigation and public outreach.

Ethical Issues in Archaeology (Zimmerman et al. 2003) includes a chapter written by Jameson (2003:153-162) in which he, like McGimsey, asserts that because of their specialized training and professional mandates, archaeologists possess the unique ability and the ethical responsibility to communicate to and educate the public about the practice of archaeology, and how and why archaeology is important.

Jeppson and Brauer's (2003) paper, "Hey, Did You Hear about the Teacher Who Took the Class Out to Dig a Site? Some Common Misconceptions about Archaeology in Schools," presents a case study and a compelling argument to support their assertion that archaeologists need not fear becoming involved in teaching archaeology in schools or in public settings, or think they are compromising their ethics or committing a disservice to the profession archaeology if they do so. Jeppson and Brauer also describe how partnerships involving archaeologists and educators can greatly benefit both professions.

Education and the Historic Environment (Henson et al. 2004) includes several case studies that describe the value of archaeology in education, and how, when positive professional relationships are established between archaeologists and educators, cultural materials may be used to reinforce curricula and to enhance student learning.

Merriman's (2004) *Public Archaeology* describes public archaeology initiatives ongoing throughout the world (including North and South America, China, Australia), and considers the diversity of the many publics involved in public archaeology, how archaeologists may participate in communicating the past among these different publics, and what factors influence how different publics arrive at their interpretations of the past.

Places in Mind: Public Archaeology as Applied Anthropology (Shackel et al. 2004) presents 10 case studies that discuss the importance of involving local communities in research and the management of cultural resources.

Davis's (2005) book, *How Students Understand the Past: From Theory to Practice*, includes several case studies that provide information regarding learning theory as it relates to archaeology education, describes public archaeology programs that are offered in schools and to the public, and includes instructional methods that can be used to support the successful delivery of archaeology education programs developed for public and school use. Davis (2005:2) suggests there is growing interest among archaeologists and educators in integrating archaeological content into pre-collegiate curricula. She asserts: "the learner is an agent in constructing the past," and as such, should have access to and be provided with educational materials and experiences that allow them to be active agents in constructing and understanding the past. According to Davis, teachers are able to provide their students with opportunities for active engagement in constructing the past through the creation of educational materials that combine archaeology and history materials.

Several university-level introductory archaeology textbooks were also reviewed in order to gain a better understanding of the extent to which archaeologists involved in

academia consider public archaeology. Textbooks reviewed include Fagan's publications, *A Brief History of Archaeology: Classical Times to the Twenty-First Century* (2005) and *Archaeology: A Brief Introduction* (2006), Fagan's and DeCorse's publication *In the Beginning: An Introduction to Archaeology (2005),* Ferraro's *Cultural Anthropology: An Applied Perspective* (2004), and Sharer's and Ashmore's textbook *Archaeology: Discovering Our Past* (2003). All of these publications include sections describing public outreach in archaeological research.

Fladmark's (1978) *A Guide to Basic Archaeological Field Procedures* was reviewed during the development of the high school archaeology unit.

The focus of *The Excluded Past* (Stone and MacKenzie 1990) is based on two arguments: 1) that most school curricula excludes the prehistoric or precontact past; and, 2) that what has been espoused and widely accepted by many as the histories of many indigenous and minority groups from around the world is not factual, and are, instead, a collection of stories and myths intentionally created to provide dominant groups the ways and means to control certain groups within their populations through oppression and misrepresentation of their histories. This book also describes some of the influences that have contributed to this oppression and misrepresentation, as well as how education has served as a vehicle that has driven (and continues to drive) political, economic and social agendas. Several of the contributing authors agree that educators can turn to archaeology to provide their students with information, resources, and learning experiences that will allow them to construct their own conclusions about the past. According to the editors of and contributors to this volume, it is imperative that archaeologists collaborate with educators to create teaching materials that are a truer reflection of the past.

Cameron's (1995) *Review of Heritage Education at Two Aboriginal Cultural Centres: A Case Study* describes issues that arose in the development of heritage education programmes at two Aboriginal cultural institutions, The Woodland Cultural Centre in Brantford, Ontario, and Wanuskewin Heritage Park, and describes the methods the author applied while selecting materials that were presented to the different publics that visited the cultural centres. Cameron also described the relationships between Aboriginal-operated museums and cultural centres, and school systems, and how links were established among these communities while the educational and interpretive materials were being developed and tested.

In the paper, Teaching Anthropology to Precollegiate Teachers and Students: Problems, Issues, and Solutions in the Teaching of Anthropology K-12, White (1997:289-290) writes:

> Elementary and secondary students and their teachers need the perspective and accumulated wisdom of anthropology every bit as much if not more than undergraduate students. Anthropology is useful because of its ability to frame the big picture and ask significant questions that cut across economics, geography, history, literature, biology, geology, and math.

Saskatchewan Learning's Educational Video Duplication Service 2005-2006 Catalogue lists a total of eight anthropology/archaeology-related videotapes available for loan to teachers. However, only one of these resources, *The Nature of Anthropology* and *Archaeology*, includes content that is suitable for integration into existing curricula.

The Royal Saskatchewan Museum's First Nations' Gallery (located in Regina) offers public exhibits that include archaeological content. These exhibits include Stone Tool Technology, Choosing the Right Stone, and Weapons Systems of the Past. A

description of these exhibits can be found at http://www.royalsaskmuseum.ca/gallery/first_nations/first_nations.shtml.

Chapter 5 of the United States' National Park Service (NPS) 2006 Management Policies, Cultural Resource Management, describes two parts of its mandate to: 1) "preserve and foster appreciation of the cultural resources in its custody" and 2) "demonstrate its respect for the peoples traditionally associated with those resources, through appropriate programs of research, planning and stewardship" (http://parkplanning.nps.gov/document. cfm?projectId=13746&documentID=12825). Fulfilment of this mandate occurs through a variety of public programs offered through the NPS. For example, the NPS houses a website, LearnNPS, which is advertised as "A Place for Teachers and Learners to explore their National Parks" (electronic document available at http://www.nps.gov/learn/home.htm), and also provides a link to the site Archaeology for Kids (electronic document available at http://www.cr.nps.gov/archeology/public/kids/index.htm), which includes an overview of the practice of archaeology, as well as interactive digs and links to other websites that are designed for youthful audiences interested in archaeology.

The Society for Historical Archaeology (SHA) Public Education and Information Committee's multi-year public outreach and education project, Unlocking the Past: Celebrating Historical Archaeology of North America, has produced a book by the same title (2005) and a companion website (electronic document available at http://www.cr.nps.gov/seac/ unlocking/unlocking.htm) provides users with information on North American history, including the histories of Vikings, Englishmen in the North American Arctic, Chinese settlements and mining sites in the west, and African Americans at

southern plantations, Jamestown, Virginia, and Quebec City (De Cunzo and Jameson 2005).

3.3 What North Americans Think About Including Archaeology in Pre-Collegiate Education

It is important for those involved in archaeology education to have a basic understanding of public opinion as it regards archaeology in pre-collegiate education. In order to answer this question, the researcher reviewed results of surveys conducted in North America as reported by the Department of Canadian Heritage (Pokotylo 2002), Foot (2005), Pokotylo (2002), Pokotylo and Guppy (1999), Pokotylo and Mason (1991), the Society for American Archaeology (2000), and Wright (2001). Results of these surveys provided insight into how North Americans view archaeology, as well as their opinions about the inclusion of archaeological content in pre-collegiate curricula. Chapter 2 provides a description of these surveys and their results.

3.4 Archaeologists and Educators: Navigating Two Cultural Realities

Archaeologists and teachers operate within two very different worlds. In the article Brokering Cultures: Archaeologists Reach Out to Teachers, Osterweis Selig (2000:152) asserts that archaeologists and teachers "have different languages, values, goals, modes of operation and professional identification," and provides recommendations for different approaches that archaeology educators can take when working with teachers. She also describes archaeologists who navigate between their own and the profession of teaching as "cultural brokers."

3.5 Theories of Curriculum Development

> A curriculum is not an archaic, inert vehicle for transmitting knowledge. It is a precise instrument that can and should be shaped to exact specifications for a particular purpose. It can be changed and it can be improved (National Indian Brotherhood 1972:9).

As part of the coursework for this research, the researcher reviewed and evaluated several articles, including Schwab's (1969) "The Practical: A Language for Curriculum," Anyon's (1980) "Social Class and the Hidden Curriculum of Work," Tyler's (1981) "Specific Approaches to Curriculum Development," Lyons's (1997) "The People's Curriculum: Henry Janzen and Curriculum Reform in Saskatchewan," Jackson's (1990) "The Daily Grind," Chamber's (1999) "A Topography for Canadian Curriculum Theory," and Robinson's (2006) "Curriculum Change in the 1980s: Directions and the Core Curriculum." Review and evaluation of these publications provided the researcher with a better understanding of some of the issues related to curriculum change and development in Saskatchewan, Canada and North America, insight into why it is necessary to challenge theoretical perspectives that have outlived their applicability, and how assumptions and realities regarding demographics and socio-economic status come into play in the development and delivery of curricula. Chapter 2 provides background information and descriptions of each of these publications.

3.6 The Saskatchewan Core Curriculum: Grade 6 Science and Grade 9 Social Studies

In order to gain a working knowledge of the components and initiatives of Saskatchewan's Core Curriculum, particularly as they frame Grade 6 Science and Grade 9 Social Studies, an in-depth review of the Curriculum's Required Areas of Study, the

Common Essential Learnings, the Adaptive Dimensions and Locally-Determined Options was carried out during the research.

3.7 The Relevance of Piaget's Cognitive Development Theory to Archaeology Education

A review of published materials regarding Piaget's theory of cognitive development, also referred as cognitive constructivism, was undertaken during the research in an attempt to assess the validity of the second assumption taken in the research.

In his article "Piaget and Archaeology," Onderdonk (1986:80) cites Piaget's assertion that cognitive growth in childhood depends not upon heredity or environment, but upon the interaction of various behavioural factors as the child develops his or her own view of reality in several successive stage. Onderdonk agrees with Schwab's (1960) recommendation that instead of merely trying to impart information, a teacher should consider designing experiences that allow a student to actively structure the subject being taught, by questioning, experimenting and discovering facts and the relationships among them. Onderdonk maintains that personal involvement, reflective thinking, social interaction, and the student as scientist, provide opportunities for students to develop cognitively.

3.8 The Relevance of Vygotsky's Sociocultural Theory to Archaeology Education

A review of published materials regarding Vygotsky's sociocultural theory, also referred to as social constructivism, was undertaken during the research in an attempt to assess the validity of the second assumption taken in the research.

In her article "Situating Archeology Education: The Relevance of Socio-Cultural Theory in Developing Public Archaeology Programs," Dale (2000:1) suggests that the context in which learning occurs is just as important as the content: "Learning and cognition are situated; the 'how is as important as the 'what'." The theme of Dale's article is that socio-cultural learning theories, particularly those involving key aspects of the learning experience, can and should be used to frame the development and shape of archaeology education programs.

In the article "Situated Cognition and the Culture of Learning," Brown et al. (1989:32) contend that there is empirical evidence to support the argument that learning and cognition are situated—that the situation or context of learning is integral to and plays a vital role in the successful delivery of curricula.

3.9 The Use of Simulated Sites in Archaeology Education

Regardless of how well run an archaeology education program may be, there are some people who oppose the use of authentic archaeological sites for public education purposes. Smardz (2000:234) writes that she has witnessed "outright hostility between members of the profession [archaeology] as to whether or not educational programs involving kids should be conducted on real archaeological sites."

A University of Saskatchewan archaeology graduate student who participated in the research at the suburban high school shared the following opinion regarding pre-collegiate students involved in archaeological excavation:

> I think the excavation of important sites should not be available to children younger than maybe 12 because it is harder for many of them to comprehend the significance and maintain proper excavation and recording techniques. It is very important to have proper instruction and supervision, even with adults, and class sizes should be limited. Sites like…[the suburban high school involved in the research] are ideal for larger groups or varied ages because children can get the

> experience of being an archaeologist, learn the importance of our cultural heritage, but do not destroy genuine sites (Heather Frary, personal communication 2005).

In the article Simulated Excavations and Critical Thinking Skills, Chiarulli et al. (2000:17-18) assert that "a simulated excavation provides the most opportunity for a meaningful learning experience" for students.

The question of whether or not to allow pre-collegiate students to excavate at an authentic or simulated site cannot be answered by a simple "yes" or "no." What is more definite is that the involvement and guidance of knowledgeable and experienced archaeologists is a vital component of any successful archaeology education initiative that involves excavation.

Chapter 4 describes the methods that were followed during the research conducted at the inner-city elementary school and the suburban high school.

4. Methodology

"The question was where to begin, what path to take, and with what end in mind." (Wolf et al, 1997:8).

This chapter provides descriptions of actions and activities associated with the research, including: 1) the rationale for the approach followed in the research; 2) the assumptions that served as devices or starting points for further investigation in the research; 3) coursework content relevant to the research, establishing relationships with teachers and administrators early in the research; 4) the University of Saskatchewan Research Ethics Board (REB) Ethical Guidelines governing students conducting research involving human subjects; 5) instruments used in the collection of data; 6) employee and volunteer assistance during the research; 7) the research program at the inner-city elementary school; 8) the research program at the suburban high school; and 9) steps followed in the analysis of the data collected during the research.

4.1 Rationale for the Methodology

The goal of the research was to answer the question: What do teachers require to integrate archaeology concepts, themes and activities into Grade 6 Science and Grade 9 Social Studies curricula?

The research protocol was designed to represent the divergent perspectives of the participants who were expected to be involved in the research, and to "explore a practical

problem with an aim toward developing a solution to a problem" (Creswell 2005:549) by focussing "on the needs of practitioners in their own classrooms" (Shulha and Wilson 2003:654). To meet these aims, the methodology followed a qualitative, multi-method, action research approach.

Action research encourages inquiry and reflection, connects theory to practice, and

> …represents an approach to research that values the knowledge of the participants, and provides a means for them to become centrally involved in a research project, all the way from defining the question to working toward a resolution or solution. This involves a change in role for the traditional researcher, from working *on* subjects to working *with* participants (Smith and Robinson 2000:3-4).

The researcher and teachers were involved in a collaborative rather than a closed experimental context (Walliman 2005:121-22), with the collection of data done through interviews that were conducted to determine participants' opinions, perceptions and attitudes (see Appendix D), questionnaires that were administered to assess participants' opinions, perceptions and attitudes (see Appendix E), a survey that was carried out to collect quantifiable data of the teachers' opinions of teaching resources developed (see Table 1), and observations that were made to ascertain what participants were doing and what was occurring during the research (Glatthorn and Joyner 2005:45). According to Brewer and Hunter (2006:4), the collection of data through multiple sources "…increases … confidence that the research results reflect reality rather than methodological error."

4.2 Assumptions

The review of the literature led to the acceptance of two assumptions that served as devices or starting points for further investigation in the research.

The first assumption was: If successful archaeology education programs in North America employed the use of hands-on, active learning, then the inclusion of hands-on,

active learning in the archaeology education resources developed for the research will also prove effective.

The second assumption was: If successful archaeology education programs in North America incorporated constructivist theories of learning, including the cognitive development theory of Jean Piaget (Dale 2000; Johnson 2000; Onderdonk 1986) and the sociocultural theory of Lev Vygotsky (Dale 2000; Howe 1996; Johnson 2000) in their designs, then reference to and inclusion of aspects of constructivist theories of learning, including Piaget's cognitive development theory and Vygotsky's sociocultural theory, will result in the development of successful archaeology education materials in the research.

4.3 Preparing for the Research: Over and Above the Literature Review

The researcher's anthropological education, training and experience was supplemented through research coursework that included an eight-month internship at Wanuskewin Heritage Park. This internship led to the development of archaeology education materials intended for use by Scouts Canada and Wanuskewin Heritage Park as part of a partnership established between the two entities. The internship was supervised by Dr. Ernest Walker.

As described in 3.3, research coursework included the review and evaluation of several articles pertaining to curriculum development, as well as the development of a middle years (Grade 5) archaeology unit in EdCurr 322.3 (that was referred to by the researcher during the development of the Grade 6 Science archaeology unit in this research (see Appendix F)). The researcher also made a presentation of the research at a

University of Saskatchewan Department of Curriculum Studies Mini-Conference for Graduate Students (2005).

4.3.1 Establishing Relations with Educational Communities

Most researchers understand that it is a rare occasion when they can arrive in a community to conduct research and be immediately accepted by the *gatekeeper(s)* of that community. One of the first priorities in this research was to establish working partnerships with the teachers and administrators of the educational communities involved in the research.

Because the teachers from the suburban high school's History Department took the initiative and invited the researcher to conduct research at their school, and the inner-city elementary school teachers expressed an interest to the researcher in integrating archaeological content into existing courses in preparation for upcoming GAMAP excavations, it was not difficult for the researcher to establish working partnerships with members of the two school communities. This allowed the researcher and teachers to hold planning meetings and begin working on the design of the teaching-learning resources within a couple of weeks after agreeing to collaborate in the research.

In keeping with the nature of action research, taking into consideration Osterweis Selig's (2000:152) assertion that archaeologists and teachers "have different languages, values, goals, modes of operation and professional identification," and recalling something one of the teachers told the researcher—an archaeologist who thinks they know it all will not survive and possibly even alienate themselves from us—the research was designed so that the teachers would lead the direction, development and delivery of the archaeology resources, while the author assumed the roles of researcher and resource

person.

In addition to holding planning sessions with teachers early in the research, the researcher also requested and received written approval from school board officials and principals to conduct research at their schools. Teachers, parents/guardians, and students were also asked to sign a form consenting/assenting to participation in the research (see Appendices A, B and C; see also 4.4.1). (These documents are maintained in a file held by the researcher.)

The researcher also provided the librarians, the secretaries, and maintenance staff who worked at the two schools with an explanation of the nature of the research, as it was anticipated that they would also play roles during the research.

4.4 University of Saskatchewan Research Ethics Board (REB) Ethical Guidelines for University of Saskatchewan Students Conducting Research Involving Human Subjects

A sound research design includes mechanisms that protect participants from any known or potential harm resulting from their participation in research. The University of Saskatchewan's Research Ethics Board's (REB) *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* includes a listing that "represents a broad overview of the range of research projects or situations that would require review and approval by the REB" (Office of Research Services 2003). This list, set out in the document entitled *Does Your Research Project Require Human Ethics Review and Approval?* includes descriptions of several situations in which prior review and approval by the REB is required before research may proceed.

While there was no known or anticipated risk or deception associated with the research, according to the design of the research, there were six activities associated with

the research that were identified as requiring review and approval of the research protocol by the Research Ethics Board. The six situations arising out of the research included: 1) the involvement of participants from outside the University of Saskatchewan setting; 2) research activities occurring outside the University of Saskatchewan setting; 3) photographs of research participants (teachers and students) taken during the research; 4) the collection of data through interviews, questionnaires, a survey and observation; 5) the use of photographs and data collected during the research in the text of a thesis; and 6) the development of teaching materials resulting from the research that could be reproduced and made available to teachers through the Saskatchewan Teacher Federation's Stewart Resources Centre. In order to meet the requirements of the REB and receive approval of the research protocol, the procedures described in 4.4.1, 4.4.2 and 4.4.3 were followed.

4.4.1 Consent and Assent to Participate in the Research

Once planning sessions involving teachers, research supervisors and the researcher confirmed teachers' interest in, as well as the feasibility of conducting the research at the two schools, the researcher sent letters to two senior school board officials, as well as the principals of the schools participating in the research, that described the nature of the research and requested their permission to conduct the research at their respective schools. All four individuals provided letters to the researcher approving of and granting permission to proceed with the research at their schools.

Teachers participating in the research were asked to read and sign (if they agreed with the terms) the Consent Form for Teachers (see Appendix A) that they received from the researcher. All participant teachers signed the Consent Form.

On the first day of the archaeology unit, teachers introduced the researcher to their students, and informed them of the nature of the research at the start of each class. The researcher then provided each class of students with a more detailed description of the research, including the intent and design of the research, and the nature of their involvement. The researcher asked students if they were clear about the nature of the research, and invited and answered students' questions, and then invited all students to participate in the research. Teachers advised students that while participation in the research was not mandatory, their participation in the social studies/archaeology education was mandatory, and they would be evaluated based on their participating/performance of the activities constituting the archaeology unit. The researcher then advised students that if they agreed to participate in the research, and then later wished to withdraw, they could do so by telling the researcher that they no longer wished to participate. The researcher also advised students that she would not inform teachers of their decision to withdraw from the research..

Students were given two forms, a Consent Form for Parents or Guardians of Students (see Appendix B), and an Assent Form for Students (see Appendix C). Teachers instructed students to take both forms home that day, and to carefully read them in the presence of their parent(s) or guardian(s). Students were advised that if they or their parent(s)/guardian(s) had any questions about the research or the forms, they should bring those questions to class the next day. Students were then instructed that once they had spoken with their parent(s)/guardian(s) about the research and received their consent to participate in the research, and if they agreed with the terms and conditions of the research as described in each of the forms, they should have at least one parent/guardian

sign the Consent Form for Parent or Guardians of Students (Appendix B) and themselves sign the Assent Form for Students (Appendix C). The researcher advised students that in order to participate in the research, both forms had to be signed and returned to the researcher, and that signing of the Assent Form only would not permit their participation in the research. Students were asked to return the signed Consent and Assent Forms directly to the researcher in order that teachers would not be aware of who did and did not consent and assent to participate in the research.

4.4.2 Maintaining Anonymity of the Schools and Research Participants

Steps were taken during and after the research to protect the identities of the students, teachers and schools participating in the research. The names and physical descriptions of the two participant schools, as well as the names of teachers, staff members or students who participated in the research are not included in the thesis, nor in any materials reporting on the results of the research. Pseudonyms are assigned to personify the contributions of the participants (quotes). The researcher advised the 13 archaeologists who participated in the research (two as employees, 11 as volunteers) of the University of Saskatchewan Research Ethic Board's regulations regarding the requirement to maintain the confidentiality and anonymity of all research participants, and instructed them to refrain from discussing what they observed during excavation and labwork activities outside the research setting, and to not reveal the identity of any student, teacher or schools participating in the research to anyone not directly associated with the research at any point in time during or after the research.

Photographic images depicting research participants are included in the thesis and presentation materials only when both a Consent Form for Parents or Guardians of

Students and an Assent Form for Students had been signed and returned to the researcher, or, in the case of two inner-city elementary school students, an official school board Parent Consent form had been signed by the parent(s)/guardian(s) of two students attending the inner-city elementary school (kept on file).

4.4.3 Storage of Data

All information that was collected during the research, including signed consent and assent forms, interview notes and responses, questionnaire responses, survey responses, observation and other research-related notes, photographs and their negatives, materials prepared by students, or any other materials related to or resulting from the research are and will continue to be stored in a secure location by the researcher for a period of five (5) years following completion of the thesis defence and printing of the thesis.

4.5 Instruments Utilized in the Collection of Data

The collection of data utilized qualitative research methods including interviews, questionnaires, a survey and observation. Data were collected from multiple sources in order to provide the researcher with a comprehensive perspective of the participants' views and activities. This section provides a general description of the data collection methods that were used during the research, while 4.7 and 4.8 provide detailed descriptions of the research conducted at the inner-city elementary school and the suburban high school.

4.5.1 Interviews

The common goal of an interview is to elicit responses from respondents. In the case of the semi-structured interviews conducted during this research, McCracken's

(1988) long interview method was used to question respondents about their special knowledge, experiences and insights of the study topic. The objectives of the interviews included learning more about the thinking, feeling, and doing processes of the respondents in order to gain an understanding of their views of the study topic in the respondents' own language. This qualitative research strategy allowed the researcher to illuminate the real world of the teacher participants, including the content and pattern of their classroom experiences—thick description in other words. The structure of the interviews was designed in such a way so as to allow teachers the freedom to express their thoughts on archaeology and education, including, but not limited to, what they expected to gain through integrating archaeology into existing curricula, how they planned to develop and integrate archaeological content into existing curricula, and their evaluation of the archaeology materials developed during the research.

A schedule of pre-determined, open-ended questions and topics (see Appendix D) served to guide the interview sessions. The schedule of questions was designed in order to keep the interview to 45 to 60 minutes in length. The language used in the questions was clear and appropriate. The sequence in which the questions were asked was not strictly adhered to; questions were asked in an order that flowed with and took advantage of teachers' previous responses when appropriate.

The interviews were held in classrooms and staff rooms at the end of the school day. The researcher restated for the interviewees the purpose of the study, provided them with explicit information about confidentiality, anonymity, privacy and informed consent, told them all opinions were welcome and all experiences were equally important (Morgan 1997), and informed them that the question and answer portion of the interview would be

tape-recorded. The tape recorder was positioned on a table (and plugged into an electrical wall outlet), clearly visible and accessible during the entire interview. Teachers were advised that they could turn off the tape recorder at any time if they wanted what they said to be off the record. No teacher availed him-/herself of this opportunity. Once the teachers were aware of the proposed procedure of the interview session, and final questions were asked and answered, the tape recorder was turned on and tested to ensure it was operational, and then the interview began. Ninety-minute mini-cassette tapes were used to record each interview.

With the tape recorder running, the researcher and each teacher identified him or herself before the questioning began. When and where appropriate, the researcher used teachers' responses to probe with follow-up questions (not included in Appendix D). The researcher took notes of what was said and observed during the interviews. The notes served to remind the researcher (during the interview) of points that were made earlier, thus allowing the researcher to formulate new questions as the interviews progressed. Notes also served during transcription and analysis of the data, and provided markers for important quotes, key phrases, or other data shared during the interviews, and as back-up data in case there was a malfunction with the tape recorder or tape during the interview (which did not occur). Once all the interview questions were asked, and teachers had no further comments to add, they were thanked for their input, and the tape recorder was turned off. A short time after the interview concluded (a few minutes), the tape was rewound for a few seconds and replayed in order to confirm the entire interview was recorded. The researcher then found a quiet place in the school to review and write down additional notes related to the interview.

Each interview was transcribed using computer software (Microsoft Word), with a hard copy transcript printed and compared to its counterpart tape recording to check the text's accuracy and make edits where required.

The researcher provided the teachers who participated in the interview with a copy of each interview transcript, and asked them to review it and make any final edits they wished to include in the transcript. Teachers were instructed to note in writing, on the left hand margin, next to the text they wished to edit, all required changes, and to return the edited transcript to the researcher within one week. The researcher edited each transcript based on the required changes, and then personally returned the revised transcript to each teacher who required changes, at which time they were advised their changes were made to the transcript, and that, if they had no further amendments to the document, it would stand as the final version, with any of its text available for inclusion in any materials resulting from the thesis research. Because pseudonyms were used to identify the teachers who participated in the research, the researcher decided that it would not be necessary to have teachers complete a transcript release form.

Results of the interviews were compared with the data collected through the questionnaires, the survey, and observations (triangulation).

4.5.2 Questionnaires

Questionnaires were administered during the research at the high school (see Appendix E) as they were considered effective in terms of the economy of time required to administer them, as the researcher could deliver them to teachers using their mail slots (located in the staff room), and teachers could return the completed questionnaires by

inserting them into envelopes supplied by the researcher, and placing it in the researcher's mail slot (also located in the staff room).

The questions were arranged in specific orders to encourage good-quality responses, and were kept short, using clear and unambiguous language, to minimize effort required by the respondents to complete them. Responses were used to verify and refute interview and survey responses and observations (triangulation).

Questionnaire responses were compared with the data collected through interviews, the survey, and observations (triangulation).

4.5.3 Survey

Conducting a survey is another way to collect useful data. The objective of the survey administered in June 2005 was to have teachers evaluate the efficacy of 37 different lessons and activities that constituted the original Archaeology Unit Plan developed for and integrated into Grade 9 Social Studies core units (see Table 1). There was a 100% response rate to the survey administered during the research.

Teachers were asked to respond to each of the first 36 questions by selecting one of three responses: √ (should be included in the archaeology unit in the future), R (should be included in the archaeology unit in the future only as a rained-out or back-up lesson, or X (should be removed from the archaeology unit). A yes or no response was sought for the last question, 37.

Reaching conclusions based on the survey responses involved taking a tally of each of the three possible selections (√, R or X) per question (with each response assigned the value 1), and then rating the teachers' level of satisfaction and evaluation of the grade 9 social studies lessons and activities based on those tallies. For example, there were five

teachers who participated in the survey, therefore, a tally of five for any response (whether √, R or X) was interpreted as teachers' unanimous support for that particular response.

Results of the survey were compared with the qualitative data collected through the interviews, questionnaires and observations (triangulation).

4.5.4 Participant Observation

Participant observation is typically exploratory and descriptive in nature, with the data collected qualitative. This thesis has already discussed the situated nature of learning (see 2.9), suggesting that the context within which an activity occurs plays an integral role in how knowledge is constructed by the person involved in that activity. With this notion in mind, the researcher observed teachers and students in their situated, natural environments. By doing so, the researcher was able to join in the routine, day-to-day activities of the teachers and students in a non-disruptive manner, and was able to observe and record participants' activities and comments at specific points in the delivery of the archaeology unit. By observing the participants in their natural, situated settings, the researcher was able to assess and identify issues or needs not revealed (explicitly or implicitly) during interviews or in questionnaire and survey responses.

The researcher took notes during and after observations, and recorded verbal reports of observations on a tape recorder following the end of each classroom/fieldwork session (after teachers and students left the classroom and archaeological site). Notes and recordings were transcribed within 24 hours of their collection. Observations of the *expert/novice* relationships that developed during the research (among the archaeologists

and students particularly) were used to assess the validity of the two assumptions taken early in the research.

Results of observations were then compared with the quantitative data collected through the interviews, questionnaires and the survey (triangulation).

4.6 Employee and Volunteer Assistance

Thirteen University of Saskatchewan archaeology students, all with previous fieldwork training and experience, participated in the research conducted at the suburban high school. Eleven archaeology students volunteered their time during the four field seasons of research, while two were hired during the spring 2004 field season. (The cost for the wages paid to the hired students was covered by a grant received from the Saskatchewan Heritage Foundation). All archaeology students held the title "unit supervisor."

Before the fieldwork began, the researcher provided the unit supervisors with a written description of the nature and goals of the research, and held brief meetings with them before and after each day's fieldwork to collect and discuss any feedback relevant to the research.

The researcher directed and assisted the unit supervisors as they provided instruction and guided the students through all facts of the fieldwork activities. This type of exchange between the experts and novices reflects how Vygotsky suggests children learn most effectively. As described in 4.5.4, observations of the *expert/novice* relationship that developed among the archaeologists and students, was referred to to assess the validity of the two assumptions taken early in the research.

4.7 Inner-City Elementary School: Motivation for the Research

The researcher was employed as a unit supervisor during the 2003 field season at the Grace Adam Metawewinihk Archaeological Project (GAMAP). During this work, the researcher learned from teachers that students received only a brief introduction to the practice and application of archaeology before their involvement in the GAMAP. Teachers cited the lack of time and relevant teaching materials as the main reasons for this limited pre-excavation preparation. One of the elementary school teachers who participated in the GAMAP and the research reported:

> Prior to your introductory unit, I had never had the time to teach anything before the Grade 6 students went on their digging adventures (partly because I have always taught a 6/7 split and so it would have been irrelevant to a half of my class and partly because I need to focus my time on a combination of both curriculums [sic] therefore, time constraints). Typically, when the students arrived at the GAMAP site, they were usually overwhelmed by what they saw and were also somewhat confused as to what they were asked to do. (Ms. Jacks, personal correspondence 2004).

In fall 2003, a principal from one of the schools that participated in the GAMAP contacted the researcher to discuss the possibility of including their Grade 6 science teachers and students in the research. The researcher agreed to the principal's request, and asked the principal to locate one or two teachers from their school who were interested in teaching with archaeology, with the understanding that research and the collection of data were the main goals of the collaboration, and the development and integration of a Grade 6 science archaeology unit a benefit of the research. The principal reconnected with the researcher in January 2004 to report two teachers were interested in participating in the research. The researcher met with the teachers in January 2004, and provided them an explanation of the nature and scope of the research, and how their involvement would benefit the research, and could be of benefit to them and their

students. The teachers, Mrs. Brown and Ms. Jacks (pseudonyms), agreed to the terms of the research, and we immediately began our collaboration on the project.

4.7.1 Participants and Setting

Two Grade 6 Science teachers, Mrs. Brown and Ms. Jacks, a First Nations Elder, and 34 Grade 6 Science students from an inner-city elementary school participated in the research. The principal and teachers informed the researcher that a relatively high proportion of the Grade 6 students were of Aboriginal ancestry, and requested that the resources to be developed incorporate First Nations' and Métis content, and take advantage of the supports available through the First Nations Elder who worked with the school.

4.7.2 Planning the Research

The researcher prepared for the research by conducting a review of the Saskatchewan Core Curriculum, specifically the Grade 6 Science curriculum. This review led to the identification of three core units that the researcher felt were well-suited to the integration of archaeology-based content: 1) Chemicals and Reactions; 2) Earthquakes and Volcanoes; and, 3) Ecosystems.

Three planning meetings were held during January and February 2004 to prepare for the development and delivery of the archaeology education materials. Both teachers attended the first and third planning meetings, while Ms. Jacks alone attended the second meeting. All three meetings began with an interview (see Appendix D) that consisted of two questions, and then flowed into a discussion of the teachers' views and plans for teaching with archaeology.

During the first planning session, the teachers agreed with the researcher's suggestion that the three core units, Chemicals and Reactions, Earthquakes and Volcanoes and Ecosystems, would be a good fit for the integration of archaeological content. The teachers requested that the archaeology unit be designed to last a maximum of two weeks (approximately 10 classes), and that the materials be ready for delivery in early March. They repeated the principal's request that, given the relatively large percentage of students who were of Aboriginal ancestry, to promote a Curriculum Initiative to include First Nations and Métis perspectives and content, and to take advantage of the presence of the Elder who worked at the school, the teaching materials include First Nations and Métis content. The researcher agreed to this request, and suggested a short list of appropriate and accessible materials (part of the Stewart Resource Centre's collection) that could be included in the archaeology unit, including *Keepers of the Earth* (Caduto and Bruchac 1989) and *Practising the Law of Circular Interaction, First Nations Environment and Conservation Principles* (Federation of Saskatchewan Indian Nations and the Saskatchewan Indian Cultural Centre 1992). The teachers agreed with the researcher's suggestion to incorporate these materials into the unit. The teachers also used the first planning meeting to discuss their preferred method of delivery of the lessons: Mrs. Brown indicated her preference to teach materials herself, while Ms. Jacks indicated her preference to have the researcher instruct her students while she observed, took notes, and became involved in the teaching at various times throughout the classroom sessions (at her discretion).

The Science unit that was developed by the researcher as part of the EdCurr 322 coursework (see 4.3) served as the framework for the archaeology education materials

developed and integrated into the Grade 6 Science core units, with further refinement of the materials taking place during January and February 2004. Research advisors Walker and McVittie supervised the development of these materials.

The first draft of the archaeology unit was complete in early February. A second planning meeting was held soon after to allow the teachers to review and edit the lessons. Only Ms. Jacks was available to attend this meeting and provide feedback on the unit. Once Ms. Jacks' amendments were made to the document, a third planning meeting was held to provide the teachers a final opportunity to review and amend the unit before its use in the classroom. Both teachers accepted the unit as presented, and it was ready for classroom use. March 1 was set as the launch date for the archaeology unit.

4.7.3 Delivery of the Archaeology Unit

Delivery of the Grade 6 Science archaeology unit (see Appendix F) occurred between March 1 and March 16, 2004. A wide range of subject matter (that complemented the three core units Chemicals and Reactions, Earthquakes and Volcanoes, and Ecosystems) were delivered to students in the nine lessons that constituted the archaeology unit, including:

- ecosystems: living things and how they interact;
- mother earth;
- biodiversity;
- the circle of interaction;
- Aboriginal peoples and their interactions with the environment;
- biodiversity that exists at Wanuskewin Heritage Park;

- climate change: The Story of Brave Bear;
- climate change on the Northern Plains (early, middle and late periods on the Northern Plains);
- how seasons are created: the sun and earth and their relationship;
- how archaeology can tell us about the past, present and future; the care involved in archaeological work; stratigraphy and the Law of Superposition;
- different methods archaeologists use to date different types of artifacts; and,
- how volcanic eruptions affect living systems (ecosystems): Pompeii and St. Elias range in Alaska, and how the St. Elias eruption may have affected the lives of the Dene people who lived in the area.

The two-week archaeology education involved a simulated excavation activity. Appendix F describes the Grade 6 Science Archaeology Unit.

As described in 4.7.2, Mrs. Brown delivered the lessons with minimal in-class assistance from the researcher (the researcher observed and occasionally served as a resource person in the classroom), while Ms. Jacks had the researcher instruct her students while she observed (from the back of the classroom), took notes, and intermittently participated in the teaching).

The researcher and teachers were in daily contact (in person, by telephone and electronic mail) to ask and answer and to arrange for any equipment and other materials that were required to deliver the lessons.

Both teachers had their students complete two assignments during the research. These assignments consisted of students creating a drawing of the early, middle and late

climatic periods on the Northern Plains, and writing a report that described their thoughts about archaeology. Once the teachers had an opportunity to evaluate these assignments, they provided them to the researcher for her perusal. (Chapter 6 discusses the content of these student assignments.)

In order for the researcher to collect data on the teachers' evaluation of the archaeology unit, and to learn more about their plans for future use of archaeological content, a meeting was scheduled for March 20, 2004. However, mid-term tests and report card preparation prevented this meeting from occurring on March 20, and it was rescheduled for March 29.

The March 29 meeting occurred as scheduled. This half-hour meeting allowed the researcher to ask teachers most of the questions included in the interview schedule (see Appendix D), and provided teachers an opportunity to assess the lessons included in the archaeology unit. The teachers and researcher agreed to reconvene in April to complete the interview.

Scheduling conflicts prevented the April meeting from occurring. The researcher administered the remainder of the interview questions by electronic mail. Ms. Jacks responded to the interview questions in June 2005. Mrs. Brown did not respond.

At the request of the teachers, the researcher did not take photographs during the research conducted at the inner-city elementary school.

4.8 Suburban High School: Motivation for the Research

In late spring, 2002, social studies teachers working at a suburban high school participated in a tour of Wanuskewin Heritage Park (located north of Saskatoon) that was led by Dr. Ernest Walker. Teachers stopped at several archaeological sites during the

tour, including one involving active excavation associated with the 2002 University of Saskatchewan Department of Archaeology and Anthropology field school. This experience led the teachers to consider and discuss the practical applications of archaeological content and activities as they relate to the Grade 9 Social Studies curriculum.

In the Fall of 2002 the teachers who toured Wanuskewin earlier in the year made contact with a school board official to request permission to integrate archaeological content into the Social Studies curriculum, and to include in their archaeology lessons an excavation at a simulated archaeological site that they proposed be built on the school's property. Once school board officials and the Meewasin Valley Authority (who oversee the care of the school's natural landscape) approved the teachers' request, Rans Groundbreaking (one of the teachers who later participated in the research) contacted Dr. Walker to request that the University of Saskatchewan Department of Archaeology and Anthropology assist them with their plan to integrate archaeological content and activities, including excavation, into Grade 9 Social Studies. As it turned out, the researcher was actively searching for a site to conduct research that would involve archaeology and education. Telephone discussions occurred and a meeting involving Dr. Walker, the researcher, and Social Studies teachers was soon held, with an agreement made for the researcher to work with the teachers from the suburban high school in the development and integration of an archaeology unit into Grade 9 Social Studies.

4.8.1 Participants and Setting

Seven Grade 9 Social Studies teachers, Elmer Podborski, Jason Williams, Ross McLochness, Suzanne Lambert, Janet Martin, Rans Groundbreaking and Joe Brown, and

655 Grade 9 Social Studies students participated in the research. The research at this suburban high school occurred over four field seasons, September 2003, June 2004, September 2004, and June 2005, with each field season consisting of two weeks of classroom instruction that covered a wide range of topics and activities, including an outdoor excavation at a simulated archaeological site located on school property, a one-day labwork session, an interpretive activity, and a two-day display creation activity. Teachers also administered mid-term and final exams, and assigned and evaluated other assignments in conjunction with the archaeology unit.

4.8.2 Planning the Research: Groundbreaking, Groundbreaking

Communications between the teachers and the researcher occurred during the winter and early spring of 2003 to determine how to proceed with our respective goals. There were many issues discussed during this early planning phase, including how to proceed with the development, delivery and evaluation of the archaeology unit, what equipment would be required for the excavation and where to acquire it, how to identify and acquire resources such as video tapes and artifact collections to complement the archaeology teaching materials, what types of materials would be required for the creation of the archaeological site and where would they be acquired, confirmation of teachers' daily schedules, setting a budget and acquiring funds to cover start-up costs (equipment, etc.), how and where to store excavation equipment during and between field seasons, precisely where to locate the archaeological site on the school's property, the design of the archaeological sites including dimensions and components, how to prepare the site for use and during off-season, and the type of screens to be used and where we would acquire them.

As it regarded the Saskatchewan Curriculum and Grade 9 Social Studies, the teachers agreed with the researcher's assessment that two Grade 9 Social Studies core units: 1) Time; and, 2) Culture: First Nations Roots, were well-suited to the integration of archaeological content and activities.

During one of the early planning sessions, one of the teachers declared the upcoming research, *groundbreaking groundbreaking*.

4.8.3 Site Preparation

By early June 2003, the location and design of the excavation site was determined. It would be located on property west of the school, would be approximately 80 square metres in size in order to accommodate the large number of students that would be excavating at the site, and would include both pre- and post-European contact components.

The researcher, the teachers and Dr. Walker began collecting artifacts, including faunal materials of a variety of species (including bison, cow, deer, fox, squirrel and chicken), a variety of lithic materials (including worked and un-worked materials such as small and large flakes, cores, small stones and larger boulders), charcoal, fragments of pottery and china, steel nails, beads and coloured glass that would be used to salt the simulated site.

On June 25, 2003, the teachers, Dr. Walker, Glenn Zolotarchuk, the researcher, and a bobcat operator (hired by the teachers) convened at the high school with the intention to build the multi-component archaeological site. The bobcat operator removed the top 14" of soil from the site, and piled the dirt at the perimeter of the site (see Figure 4.1). With a working area now exposed, the teachers and archaeologists began to build features and

position materials where appropriate: tipi ring features in the pre-contact area, with ash and burned pottery and bone fragments placed within the associated fire pits and inside and outside the tipi rings, and china fragments, coloured glass, beads and nails positioned within the trade post foundation (see Figures 4.2, 4.3, 4.4 and 4.5).

Figure 4.1 Suburban high school simulated site, June 25, 2003, after the removal of 14 inches of topsoil (note in the foreground the skeleton of a white-tailed deer (Odocoileus virginianus) awaiting burial at the site).

Figure 4.2 High school teachers and Dr. E. Walker creating trade post foundation feature.

Figure 4.3 A high school teacher filling fire-pits with charcoal.

Once the features and artifacts were in place, the bobcat operator carefully backfilled the site with the dirt previously removed. The site sat for two months, allowing the soil to

settle. A Social Studies teacher and the researcher paid occasional visits to the site over the summer, and maintained communication to discuss the upcoming classroom and fieldwork activities.

Figure 4.4 View of the southeast portion of the high school's simulated site, including the section of a tipi ring (background) and fire-pit features (left of ring) and other scattered artifacts.

Figure 4.5 View of the high school site from main datum point. Note the remains of the trade post foundation and associated artifact scatter (foreground) and artifact scatter and other features (background).

By late August 2003, summer rains and hot weather had caused vegetative growth and a hard covering of soil at the site. In order to proceed with our plans to lay the grid at the site in early September, the researcher and teachers had to clear the site of the dense vegetation, and carefully loosen the uppermost surface of the soil. The school's maintenance staff assisted by removing the larger vegetation with a tractor mower, while the teachers and the researcher used rakes to work the soil's surface. Once this was done, we were ready to lay the grid at the site.

A large steel parking post located approximately seven metres directly north and within centimetres of the western perimeter of the site was selected as the site's main datum point. Standard archaeological procedure was followed in the laying of the grid for the 81 square metre units.

The researcher provided detailed written and verbal instruction to the teachers during the site preparation work, and recommended to the teachers that they pay careful attention and participate in this work as they would be responsible for preparing the site as part of future archaeology education field seasons.

4.8.4 Fieldwork Preparation

As described previously, the researcher maintained contact with a Social Studies teacher during the summer of 2003 to discuss how to prepare for the upcoming classroom lessons and fieldwork. It was decided that eight excavation kits would be required for students (based on an average of 28 students per class, working in teams of four, and one extra for larger classrooms). Glenn Zolotarchuk, a skilled carpenter who volunteered to make the screens for the school, was given a drawing of a basic screen to work from, and had, within two weeks, produced four portable screens that stood the test of time and

thousands of pails of dirt (see Figures 4.6 and 4.7). The office of Greater Saskatoon Catholic Schools provided a grant to the high school to cover the cost of the excavation equipment. Approximately $900.00 was spent on excavation equipment. The school provided the paper and overheads.

In addition to the four screens, the following equipment was assembled for the classroom and excavation activities:

- 8 plastic totes (kits) (25 to 40 litre storage capacity)
- 18 trowels (2 per kit; 2 extra)
- 8 good-quality dustpans (plastic)
- 8 1" brushes
- 8 2" brushes
- 18 steel pails (2 per kit; 2 extra)
- 8 line levels
- 8 measuring tapes
- 8 clipboards
- 75 10" steel stakes
- 1000' good-quality, weatherproof nylon cord
- 20 toothbrushes
- 20 pencils
- 2 pencil sharpeners

- 400 index cards (3” x 5”)
- 400 zip-loc baggies (200 small / 200 medium)
- 4 shovels (2 spade, 2 square)
- 200’ heavy-duty tinfoil
- 4 tarps (12’ x 20’ each)
- screen (for repairing damaged screens) (cost borne by G. Zolotarchuk – donation to school)
- 500 sheets 20 lb. white bond paper (for classroom work)
- 200 overheads (for classroom work, to supply all teachers).

Figure 4.6 Suburban high school excavation site: two of the three screens designed, built and donated to the high school by Glenn Zolotarchuk.

The intense use of equipment resulted in screens requiring repair and trowels requiring replacement during the first and subsequent field seasons. The teachers applied for and received a grant from the Saskatchewan Archaeological Society to cover the cost of this equipment, and the cost of bobcat operator services.

Figure 4.7 View of the high school site from main datum point (northwest of site); between classes on the first day of excavation. Fieldwork assistants Unit supervisors in background.

4.8.5 Equipment Storage, Site Maintenance and Security

Excavation equipment including fieldwork kits, screens, pails and shovels were stored in the school's main garage located close to the site. This arrangement proved unsatisfactory as school staff smoked in the garage during recess and lunch breaks, and

access to the garage was difficult as the door was often pad-locked and only one of the teachers participating in the research had a key to open the lock.

These issues were addressed in June 2005, when the Social Studies teachers purchased a large storage shed from a student attending the high school (who had made the shed as part of a shop class project). The shed was upgraded with a roof, eaves, and siding, painted green on the exterior, and equipped with hooks and shelving on the interior to accommodate excavation equipment (the researcher assisted the high school teachers with some of this work). The shed was secured by a pad-lock which all the Social Studies teachers had a key to.

Steps taken to maintain the site were similar from field season to field season, and involved re-salting the site with the artifacts previously excavated (while features remained intact), and having a bobcat operator backfill the excavated units using soil excavated by students during the previous field season. (Teachers and the researcher backfilled the units using shovels and wheelbarrows after the first field season, but found this work to be extremely physically demanding and time consuming, and opted for a professional to perform this task.) Once the excavated units were backfilled, the site was left to settle between field seasons.

According to standard archaeological procedure, the excavation site was covered at the end of each day using tarps that were secured by stainless steel stakes and large pieces of wood. Unfortunately, but not unexpectedly (given that this site is located on a school property), despite attempts made to secure the site, there was evidence of non-research-related entry onto the site after hours and during weekends (fast-food and candy wrappers, magazine photographs, and other items left by students). The teachers and the

researcher discussed the possibility of installing surveillance equipment on the roof of the school to monitor activities at the site, or erecting a fence around the perimeter of the site to limit unauthorized entry onto the site during fieldwork sessions. However, both responses were withdrawn due to cost of equipment, and how the presence of a fence would contradict the principles of maintaining the natural landscape of the site. It was concluded that the most reasonable approach to take in providing site security would be for students to note the condition of the site on their Level Records each day that they excavated. It was further concluded that the benefits of such an activity would be two-fold: 1) the ability to note and respond to inappropriate activities occurring at the site; and, 2) that such an activity would reinforce among students principles of preservation and protection of cultural resources (reinforcing stewardship principles that were introduced to students during the classroom lessons).

4.8.6 Delivery of the Archaeology Unit

The Grade 9 Social Studies archaeology unit (see Appendix G) was delivered during four sessions held in September 2003, June 2004, September 2004, and June 2005 (and continues to be delivered at present). Each unit consisted of approximately two weeks of classroom instruction, one week of outdoor excavation at the simulated site, one day of laboratory work involving cleaning, analyzing and cataloguing artifacts, one day in an interpretive activity, and two days spent in the creation and set-up of an archaeology display located in the library showcase. The final version of the archaeology unit included nine lessons:

Lesson 1 An Introduction to Archaeology
- What is Archaeology?
- What is an Archaeological Site?
- What Do Archaeologists Find? Artifacts, Features and Ecofacts

- Pre-Contact and Post-Contact Archaeology: What's the Difference?
- Rock Art
- The Tools Archaeologists Use: What Are They?
- The Archaeology Crew: Who Are They And What Do They Do?
- Analyzing and Interpreting the Meaning of Artifacts: Questions We Can Ask and Try to Answer
- Why Is It Important To Know About the Past?
- Rules of Archaeological Excavation
- Archaeology Quiz

Lesson 2 Artifacts: Show and Tell, and Film on Excavation Methods

Lesson 3 Tour of the High School Archaeological Site

Lessons 4-5 Bison of the Northern and Great Plains
- Film: The Secrets of Wanuskewin
- The Generous Bison
- Seasonal Migration
- The Bison Past and Present: The Effects of European Contact on the Bison and the people of the Northern Plains
- Bison Hunting on the Northern Plains: Descriptions of Three Bison Hunting Methods

Lessons 6-9 Excavation, Laboratory Methods and Artifact Analysis, Site Interpretation Activity, Create and Set-up Archaeology Display

4.8.6.1 Classroom Instruction

Each field season included two weeks of classroom instruction that covered a wide range of subjects (see 4.8.6). The teachers taught the archaeology unit while the researcher remained present in the classroom (usually sitting at the back of the classroom), observing, taking notes, and serving as a resource person when asked to do so by teachers.

At the end of the first lesson plan, students were asked to write an archaeology quiz containing ten questions, seven of which they were required to answer correctly in order to be able to participate in the excavation. Those few students who did not attain at least seven out of 10 on the quiz were permitted to rewrite the exam before the fieldwork

commenced (usually re-written after the Lesson 3 tour of the site). No student was excluded from the excavation based on his/her standing on the archaeology quiz.

Students were taken on a tour of the archaeology site during Lesson 3 of the classroom instruction. The instruction students received during the site tour was intended to prepare them for the excavation that would follow the classroom lessons. Students were provided with information about the physical layout of the site, including the site's main datum point and its form and function, and how and why the site and its units are designated/named according to their position in relation to the site's main datum point. (The researcher did not describe the Borden system to students as it was considered too abstract a concept for students to understand.) The researcher demonstrated proper excavation techniques to students, including how to remove soil with a trowel, how to expose an artifact or feature using a trowel, brushes and picks, and how to pedestal an artifact. Students were shown how to identify cultural and non-cultural materials (i.e., a worked core or a flake compared to a non-cultural item), as well as the typical characteristics of bone, wood, pottery and lithic materials, in raw and burned form. With the aid of student assistants, the researcher demonstrated how students, working in pairs, take and record three-dimensional measurements of an artifact/feature. The researcher also explained and demonstrated for students how to package different types of artifacts for storage until we work with them in the lab (i.e. charcoal wrapped loosely in tin foil and then placed into plastic bags with Artifact Card, etc.). This hands-on instruction reinforced among students the concepts introduced to them during earlier and later classroom lessons, and proved particularly beneficial to students as they conducted excavations at their site.

4.8.6.2 Excavation

Students spent up to five hours (five classroom periods) excavating (see Figures 4.8 to 4.14). Occasional incidents of inclement weather prevented some of the classes of students from being able to excavate the full five hours. Rained-out days were spent in the classroom, where teachers taught their own version of back-up lessons and assigned textbook readings.

Fieldwork involved standard archaeological procedures associated with the recovery, provenience, removal (where applicable), paperwork and preparation/storage of artifacts (for use in the lab). Students completed Artifact Cards (see Appendix H) for each artifact they recovered. After the paperwork was completed for each artifact, each artifact was bagged/wrapped (as appropriate), placed with its paperwork into a large container located a few metres from the southern perimeter of the site, stored in a secure location in the school's garage for the duration of the fieldwork session, and then taken into the school at the end of the fieldwork, where they would be sorted for the upcoming labwork session. Students wore latex gloves during the excavation sessions.

Students completed Level Records (see Appendix I) as part of their daily excavation activities. They also plotted and sketched features and artifacts onto floor plans during the first fieldwork session; however, teachers noted by the second day of this session that this activity was time-consuming and difficult for students and, after a discussion with the researcher regarding how removing this aspect of the fieldwork would affect the quality and meaning of the excavation experienced, made the decision to exclude the completion of this paperwork from the excavation activities.

Figure 4.8 **A unit supervisor (second from left) assisting students with recording the provenience of an artifact (June 2004).**

Figure 4.9 **Students actively engaged in fieldwork (September 2003).**

Figure 4.10 Students excavating their unit.

Figure 4.11 Students measuring the depth of an artifact.

Figure 4.12 Students clearing a fire-pit.

Figure 4.13 Students at work.

Figure 4.14 An enthusiastic student working during a break.

4.8.6.3 Labwork

After the excavation concluded, one of the Social Studies teachers who participated in the research retrieved and brought into the school the artifacts that were stored in the school's garage. The total number of artifacts was counted, with that number divided by the number of classes that would be processing artifacts in the lab. The teacher also collected and labelled (with the teacher's name) two boxes for each teacher who participated in the research, and also arranged for the assemblage of the following items that would be used during the labwork:

- seven tables;
- blank Lab Cards (enough for one for each artifact to be processed);
- 10 pencils;
- baggies, tin foil and paper bags;
- four pails (used during the excavation);
- eight toothbrushes (more if possible);
- four rolls of paper towels;
- four weigh scales;
- two sets of callipers;
- two measuring sticks ;
- two magnifying glasses; and,
- Catalogue Sheets (2 per classes, one numbered 1 to 30, one numbered 31 to 60.

The researcher created the Catalogue Sheets and Lab Cards and provided master copies of both to one of the teachers who participated in the research to produce

photocopies from, the teachers assembled the pails, baggies, tin foil, paper bags, measuring sticks, pencils, paper towels, and toothbrushes (donated to the project by one of the teacher's dentist), the tables were already located in the archaeology lab, while the weigh scales, callipers and magnifying glasses were loaned to the Social Studies teachers by the high school's Science Department.

The archaeology lab was set up in the basement of the high school. Each class was responsible for processing all the artifacts they were assigned. Most students processed two artifacts each. The archaeology lab housed seven tables:

- one table, the artifact table, held a box (labelled with the teacher's name,) that contained unprocessed artifacts and Artifact Cards, several blank Lab Cards (see Appendix J) (one for each artifact to be processed), some pencils and erasers, and another empty box (labelled with the teacher's name) that would hold artifacts that were processed by that class in the lab;

- one table, positioned beside the artifact table, that would be used as a writing surface where students would transfer data from the Artifact Card to the Lab Card;

- one table that held four weigh scales (see Figures 4.15, 4.16 and 4.17);

- one table that held two measuring sticks, two sets of callipers and two magnifying glasses;

- two tables that each held two pails (excavation equipment) that were half-filled (or slightly less) with lukewarm water and two toothbrushes for each pail (one for wet brushing and one for dry brushing), and a roll of paper towels at each end of the tables; and,

- one table that held two Artifact Catalogue Sheets (see Appendix K), the first sheet numbered 1 to 30, the second numbered 31 to 60.

The lab session began with the researcher explaining to students why archaeologists use care when handling and cataloguing artifacts. This was followed by a demonstration of the methods and processes involved in processing different types of artifacts. Students were taken through the labwork process, from station to station, led by the researcher and a student who volunteered to assist.

The demonstration began at the artifact table, where the student retrieved an artifact and accompanying Artifact Card from the box, took a blank Lab Card, and moved to the table located beside the artifact table where they transferred information (including the unit number, quadrant, provenience, artifact type, etc.) from the Artifact Card to the Lab Card. The next stop was the cleaning station, where the researcher explained which method is suitable for different types of materials (i.e., immersion into water and wet brushing acceptable for lithic materials and large bones; dry brushing for pottery fragments; no water and as little handling as possible for charcoal) and demonstrated how to apply the methods to different types of materials. The student took the lead again, and moved on to the weighing and measuring station where the researcher explained and the student assistant demonstrated how to use and read the weigh scales and callipers, and how to record data collected at this station onto their Lab Card. The next stop was the cataloguing station, where students were shown how to transfer data from their Lab Card onto the Catalogue Sheet, and where they once again received an explanation about why it is necessary that the data recorded on the Artifact and Lab Cards and Catalogue Sheets be correct and clearly written. Once student assistants completed processing their artifact,

they were instructed to place it and its accompanying Artifact and Lab Cards into the box that was reserved for artifacts processed by that class. The artifacts placed into this box would be used for the upcoming interpretive activity. Figures 15 to 18 depict high school students involved in labwork.

Figure 4.15 A student weighing a bison bone in the lab.

Figure 4.16 Students weighing artifacts in the lab (with teacher looking on).

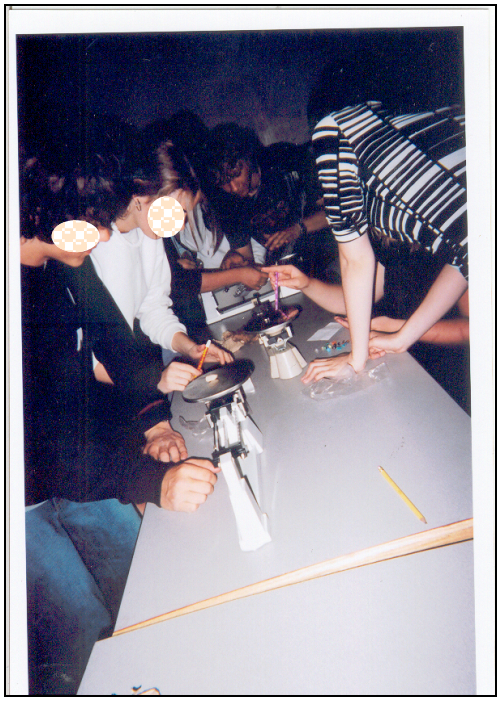


Figure 4.17 Students at work in the lab.

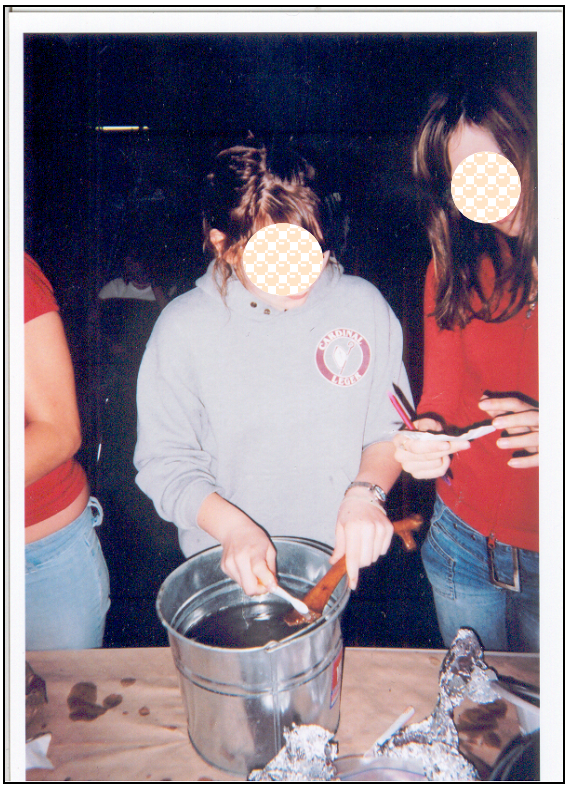


Figure 4.18 **Students washing artifacts and discussing paperwork.**

At the end of each class, the teacher collected their box of processed artifacts, and took it and the completed Catalogue Sheets and emptied artifact boxes back to their classroom, where they would be kept and used the next class during the interpretation activity.

The box of artifacts assigned to the next class, more blank Lab Cards, and another empty box (for processed artifacts) were retrieved from an area close by (but away from the lab area), and placed on the artifact table for the next class's use.

The teachers and students emptied water from the pails, paying careful attention to the drain screens and removing and returning to their teacher any materials that came out with the water (these materials were set aside, to be reburied at the site during preparation for the next field season). The pails and toothbrushes (used for wet brushing) were rinsed

clean (the dry toothbrushes were cleaned with a dry cloth or paper towel), and the pails were refilled (half-way or less) with lukewarm water. The paper towels that lined the table were removed and replaced, and the pails (with water) and wet and dry toothbrushes placed beside each pail. Weigh scale platens and magnifying glasses were gently wiped clean, and callipers were reset to zero.

At the end of the lab session, the emptied artifact boxes and all equipment were loaded onto a trolley, and returned to their owners.

4.8.6.4 Interpretation Activity

Students continued to work the artifacts they processed in the lab during an interpretation activity. This activity involved each student retrieving an artifact and accompanying Artifact and Lab Cards from the box of artifacts they had processed in the lab the previous class, and then, using dry, erasable markers of different colours (for each of the different types of artifacts, ie, red for charcoal, blue for flakes and other lithics, black for bone, etc.), plotting and sketching their artifact onto a 4' x 8' laminated site map that was taped on the wall at the front of the classroom.

Before the interpretation activity began, a compass was drawn, unit numbers were written, and features were plotted onto the site map in order to provide students with a sense of orientation.

After each student plotted and sketched their artifact, they put it and accompanying Cards into a box (that was brought up from the lab the day before), and held for the display that would soon be created.

Once each class had plotted and sketched their artifacts, the students were asked to take into consideration what they learned during the classroom, excavation and labwork

activities, as well as the information that was presented on the site map, and write a one-page essay (double-spaced, on lined paper) describing what they believed, based on the evidence, had occurred at the site, including such information as the types and numbers of animals present at the site, the number of individuals who may have occupied the site, when the site was occupied, what activities occurred at the site, what types of food were consumed at the site and how it was stored and prepared for consumption, where people slept, and anything else they could infer, based on the evidence. Students were given two days to complete this assignment. In their evaluation of the assignment, teachers took into consideration that, by the time the third, fourth and fifth class of students had had an opportunity to plot and sketch their artifacts on the site map, the students in these classes had considerably more evidence to base their interpretations on.

After each class, the site map was carefully removed and transported to the next classroom. After all of the classes had had an opportunity to plot and sketch their artifacts, the site map was carefully removed and stored for its use as part of the archaeology display—the final lesson in the high school archaeology unit.

4.8.6.5 Creation of Archaeology Display

During this final classroom activity, teachers instructed students to create sketches and drawings, short written reports, and posters (using photographs that teachers and the researcher had taken and had developed) (see Figure 4.19) to be used as part of an archaeology display that would be assembled by the students and exhibited in the library showcase at the school (see Figure 4.20). Students were evaluated on their participation in and contributions to the creation of this display.

Hundreds of students passed by the display every hour on their way in the main hallway going to and from classes. According to teachers, and as observed by the researcher, the archaeology display generated quite a lot of enthusiastic discussion among the hundreds of students and many teachers and staff who passed by the showcase throughout the day.

The display was left up for approximately one week, and was then dismantled by the teachers and students. Artifact and Lab Cards were discarded, the equipment was assembled and stored (with the rest of the equipment), and the artifacts were collected and put into a box, and reburied at the school's archaeology site within a few days.

Figure 4.19 Students creating posters for the high school's archaeology display.

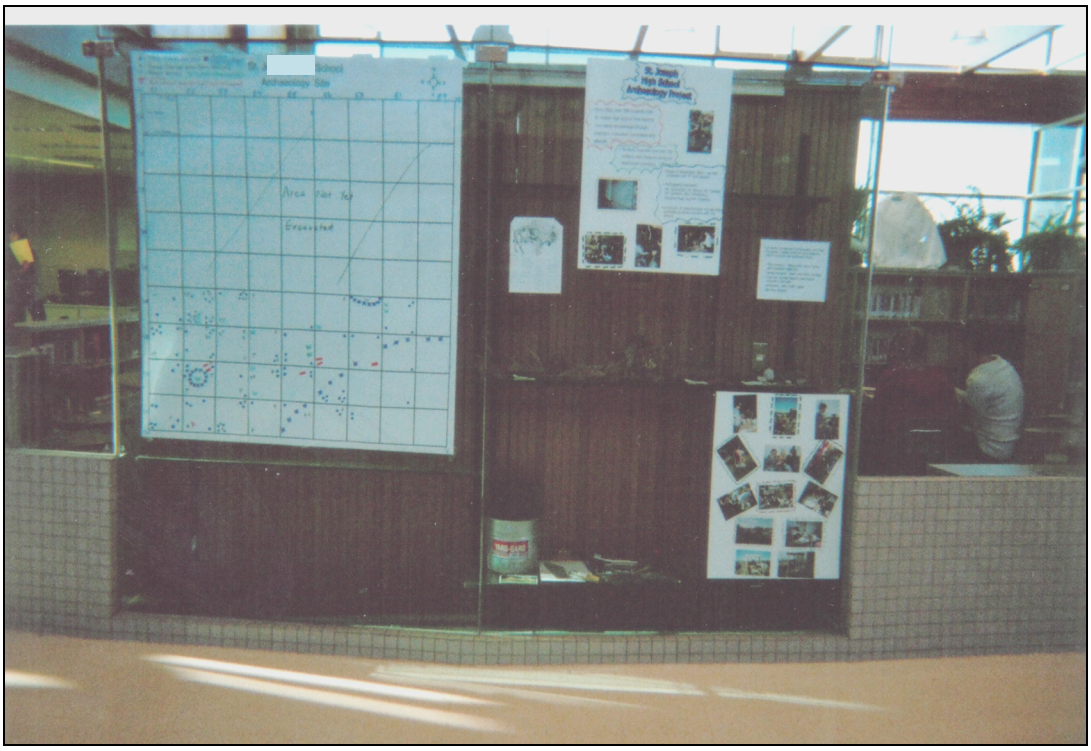


Figure 4.20 **The June 2005 field season archaeology display. The left section of the display includes the plotted site map, while the right section is a display of artifacts, and students' sketches, reports and posters.**

4.8.7 Archaeology in Final Exams

In addition to evaluating students' performance during classroom, excavation, labwork, and display creation activities, teachers also included several archaeology-related questions in the Social Studies final exam. Mr. McLochness had this to say to the researcher about including archaeology content on the final exam: "At-risk-of-failing kids, I had one that passed the class because of archaeology. The effort that they gave, the dedication, helped them to pass the class."

4.9 Analysis of the Data

The main goal of the analysis of the data set was to identify and compile responses to the research question: What do teachers require to integrate archaeology concepts,

themes and activities into Grade 6 Science and Grade 9 Social Studies curricula?, and to assess the validity of the two assumptions taken by the researcher after a review of the literature: 1) that activities included in the archaeology education materials should involve students in hands-on, active learning situations; and, 2) that constructivism, a theory of knowledge, as demonstrated through the cognitive development theory of Jean Piaget (cognitive constructivism) and the sociocultural theory of Lev Vygotsky (social constructivism) is relevant to archaeology education, and provide data verifying these results.

The qualitative data collected during the research consisted of words and observations. Simplifying and making sense of the data is the challenge of content analysis. Getting to know the data involves selecting, focussing, simplifying, abstracting and transforming the data in order to provide "an organized, compressed assembly of information that permits conclusion drawing…" (Miles and Huberman 1994:11). Overriding the process of the analysis of the data was the constant referral to the question guiding the research, and the two assumptions that were taken after the literature review.

4.9.1 Making Sense of the Data: The Challenge of Content Analysis

Glaser and Strauss (1967) theorize that the process of analyzing qualitative data involves the constant comparison and contrasting of data to identify significant patterns, which is followed by the development of emergent questions (based on the previous data), and the re-evaluation and refinement of previously identified patterns.

Several steps were taken to prepare for the analysis of the data collected in this research, including: 1) the creation of transcripts for all the tape-recorded interviews and researcher's comments (all interviews were recorded); 2) the review of interview,

questionnaire and survey responses, observation notes and students' comments, and the inclusion of written comments in the margins of these documents that recommend actions to be taken regarding specific segments of the texts; and 3) the organization of all relevant documents for further use, including coding the data.

The process for making sense of the data also considered the methods Rudestam and Newton (2001) present: studying responses to interviews and questionnaires and reviewing survey responses and observational data, determining similarities, and then categorizing them into common themes. Once common trends and themes emerged, a process of sorting them into categories began. Descriptive, multi-dimensional categories were then labelled using codes that represented their essence. Excerpts of the data were coded (in the margin left of the text) using an open coding process (Strauss and Corbin 1998). Coffey and Atkinson (1996) suggest that open coding allows a researcher to develop categories of concepts and themes emerging from the data. Reviews of the entire set of coded data led to the revision of some categories. Elaboration and analysis continued through questioning based on the assigned data. Focus was not only on the naming of the categories and the supporting data, but also on how these categories were related through an active search for the specific and variable conditions and/or consequences. Categories and sub-categories were noted and labelled.

Review of the documents and their early coding led to further comparisons of the data, broadened the scope of the analysis of the data, and led to the creation of new codes that were selected and applied to the data, a process Strauss and Corbin (1990) refer to as axial coding. Several codes were ultimately generated during the analysis of the data, including data relevant to the research question (assigned the code *RQ*), data relevant to

the first and second assumptions (assigned the codes *A1* and *A2*), data collected through the researcher's observations (assigned the code *O*), comments made by students (assigned the code *SC)*, and other significant excerpts (assigned the code *S*). When a body of text was identified as representing more than one code, this was noted on the left hand margin next to the relevant text, and considered during the analyses of the data. It was during this process that the usefulness of open-ended interview questions was confirmed—the data collected through this method were descriptive and rich.

Once all the data set was reviewed and coded, the researcher opened the word-processed transcripts, observation notes and students' comments, and coded the corresponding texts. These newly-coded word-processed texts were then copied and pasted into new documents that were named according to the genre of coding assigned, including research question, one of the two assumptions, observations, students' comments, and other significant excerpts. Where only hard copies of documents were available (i.e., observation notes or students' comments), coded texts from these documents were retyped in the associated word-processed document.

The process followed in the coding and analysis of the data was complex and time-consuming as it involved several reviews of the transcripts, documents and notes to ensure that all the data were considered, and that all trends, themes and issues were identified and accurately categorized, and that required word-processed files were created and accurately represented the coding contained in the hard-copy documents.

Chapter 5 presents results arriving out of the analysis of the data.

5. Results

The purpose of this study was to answer the question: What do teachers require to integrate archaeology concepts, themes and activities into Grade 6 Science and Grade 9 Social Studies curricula?, and to assess the validity of two assumptions that were taken after the review of the literature: 1) If successful archaeology education programs in North America employed the use of hands-on, active learning, then the inclusion of hands-on, active learning in the archaeology education resources developed for the research will also prove effective; and 2) If successful archaeology education programs in North America incorporated constructivist theories of learning, including the cognitive development theory of Jean Piaget and the sociocultural theory of Lev Vygotsky in their designs, then reference to and inclusion of aspects of constructivist theories of learning, including Piaget's cognitive development theory and Vygotsky's sociocultural theory, will result in the development of successful archaeology education materials in the research.

Data were collected and analyzed as described in the previous chapter. The results of this process are presented for each school in this chapter. Pseudonyms are used to identify the participants who contributed data presented in this chapter.

5.1 Inner-City Elementary School: Grade 6 Science

The archaeology unit developed for the Grade 6 Science teachers complements three core units: 1) Chemicals and Reactions; 2) Earthquakes and Volcanoes; and 3)

Ecosystems, and the optional unit, the Earth's Climate. The unit also promoted several learning objectives, factors of scientific literacy, and common essential learnings that are required for Grade 6 Science education, and produced a classroom environment where female and male students could participate in activities, and where stereotypical views that were held by some students could be raised, discussed, and addressed in a non-threatening way.

Data were collected at this school through interviews (see Appendix D), observations made by the researcher, and students' comments. Following is a presentation of the results of these data.

5.1.1 Results Relevant to the Research Question

Following are excerpts taken from interview responses provided by the inner-city elementary school teachers during the research. These results are relevant to the research question as they describe what the teachers require as far as content and delivery to integrate archaeological concepts, themes and activities into Grade 6 Science. The teachers reported:

"We don't have any extra classroom time" (Mrs. Brown).

"I don't have adequate knowledge of archaeology to teach it to students" (Ms. Jacks).

"The lessons need to be friendly and easy to use" (Ms. Jacks).

"Each student should get at least 1½ hours of classroom work before they excavate" (Ms. Jacks).

"We need a binder of resources, with in-depth background materials for us to read before we teach, and with videos and fun worksheets for students "(Ms. Jacks).

"We don't have any artifacts or archaeology-related materials to use in the classroom" (Mrs. Brown).

"We need some sort of answer key listing outcomes and expectations of students" (Ms. Jacks).

"The lessons must meet Curriculum objectives" (Mrs. Brown).

"The lesson plans must be evaluatable [sic]. We could do rubrics for the lessons" (Ms. Jacks).

"We could bring use of the internet into the lessons as an extra resource" (Mrs. Brown).

> The introduction and video for the ecosystems lesson were very good. It's helpful to describe ecosystems and biodiversity and to ask students questions before they watch the video to get them thinking. Rather than having them write notes before or during the video, we should give them a handout with notes and blank lines they can write answers on after they watch the video (Ms. Jacks).

"It's good to describe the excavation group and the rules of excavation early on in the lessons, like who keeps records, who leads, the spokesperson, etc." (Ms. Jacks).

"We should spend a fair amount of time on introducing the key terms" (Mrs. Brown).

"The earth's climate lesson is good. We need more of an introduction for the terms though. We like the interaction between teacher and students associated with this lesson. The storytelling aspect is good. We could evaluate students' writing too" (Ms. Jacks).

"It would be okay to extend the digging activity over two days" (Ms. Jacks).

"It would be good to have an archaeology resource person in the classroom when we're teaching the unit" (Mrs. Brown).

"Timing is important—earlier in the year is better. It's tense during report card time, so we shouldn't do it then" (Ms. Jacks).

"The unit kept their attention as it employed a variety of presentation techniques (i.e., group work, class discussion, direct instruction, use of videos, etc.) and used different assignments (note taking, drawing, recording, etc.)" (Ms. Jacks).

"The students said that they think that it is important to get the introduction before starting to dig so they have a better understanding of the idea of archaeology. I agree with them!" (Ms. Jacks).

"The review after the lessons was useful in evaluating students' grasp and understanding of the lessons taught" (Mrs. Brown).

Participant observation was included as a method of collecting data at the inner-city elementary school in order to note the behaviour of teachers and students in a natural setting (the classroom) at specific points during delivery of the lessons. Following are excerpts from the researcher's notes that are relevant to the research question. According to the researcher:

"The First Nations Elder provided useful direction in the development of some of the lessons."

"It is important that the lessons include assignments that teachers can evaluate and include in students' grades."

"The teachers have limited time to plan and develop the archaeology lessons, as well as for interviews and discussions—make the most effective use of time spent with teachers."

> Even though every lesson that involved the use of Power Point had this written on the title/introductory information, the teachers apparently did not take notice of this requirement, and then told me a few minutes before the first lesson was to be delivered that the school did not have any computers with Power Point software available, and that overheads were the only equipment available. I had less than half an hour to reformat the lessons into overhead and handout documents. Lesson learned: make sure you know what equipment is available BEFORE you create lessons!

"Make use of the photocopier at the school, and provide students with handouts when the overheads include a lot of text."

> The teachers reported that there are several students participating in the research who do not live with their biological parents. Teachers have asked that no photographs be taken during the research in order to protect the identities of these students.

> When I ask each teacher to participate in an interview, or when I hand them a questionnaire that I want them to complete and return to me, the same teacher responds in a timely fashion to my requests, while the other teacher does not: she would usually tell me she will find the time and get back to me. For a time, I wouldn't hear back from her. This happened a couple of times. Then, things changed: when, in my presence, the other teacher mentioned that she was going to participate in an interview or provide information I've requested, the non-respondent teacher would immediately tell me that she wanted to participate in the interview/provide information, etc. As soon as I caught onto this behaviour, I began making requests for interviews/information when both teachers were present, and had much better success in having both teachers participate and provide information when I requested it.

5.1.2 Results Relevant to the Assumptions

Following are excerpts taken from interview responses provided by the inner-city elementary school teachers during the research. These results are referred to to assess the validity of the assumptions taken in the research. According to the teachers:

"The drawing assignment associated with the earth's climate lesson brought an abstract concept to life for the students" (Mrs. Brown).

"The demonstration of the law of stratigraphy and filling out the artifact card made it understandable for students. I used that assignment to evaluate students' work" (Ms. Jacks).

"The interactive nature of the story that was told during the 'Our Vesuvias' lesson was excellent" (Mrs. Brown).

"The students told me that they really valued the 'practise dig' during the hands-on experiment…it made them less nervous and more confident as they were doing the real dig, and they recognized the importance of what they may discover" (Ms. Jacks).

Following is an excerpt of from the researchers' notes taken during observations conducted at the inner-city elementary school. This excerpt is referred to to assess the validity of one of the assumptions taken in the research. According to the researcher:

"Students demonstrated and also told me that that they much prefer the hands-on activities including excavation and lab work more than they do the classroom lessons."

5.1.3 Results Beyond the Scope of the Research Question and Assumptions

Following are comments made by the inner-city elementary school teachers during the interviews. These excerpts address topics that are beyond the scope of the research question and assumptions. According to the teachers:

"The earth's climate lesson was the hardest to teach" (Ms. Jacks).

"The chemicals and reactions lessons should be provided in a table on an overhead" (Ms. Jacks).

"It's better to provide a handout with notes rather than having students write notes, so they can pay attention to the activity" (Ms. Jacks).

"I try to explain the Aboriginal perspective to students, but I think it's important for students to hear it from someone other than me. The Aboriginal perspective including land and animals was very useful" (Ms. Jacks).

> I think that at the beginning of the unit some of the students saw this as something else they have to do to pass the time, and were not too enthused about it. I think that as time went on the introductory unit not only provided them with background knowledge of archaeology as a generality, but the entire experience meant a lot more to the students (Ms. Jacks).

5.1.4 What Grade 6 Science Students Had to Say About Archaeology and Archaeology Education

The researcher also collected data from some of the inner-city elementary school students who participated in the research. Students made the following comments:

"I found that learning about the different cultures was very interesting, like how the culture did things and what kinds of tools they used."

> I learned about stratigraphy and what it means. I enjoyed having first-hand experience and it was the coolest thing I done [sic] so far. I think my little brother would enjoy doing this when he's in Grade 6. I'm expecting to find different levels of dirt [at GAMAP]. And garbage. Maybe even clay!

"I used to dig on my grandpa's farm. He made me stop because he has tipi rings on it, and he won't let anyone go near to them because he says they're sacred."

5.2 Suburban High School: Grade 9 Social Studies

The archaeology unit developed for the Grade 9 Social Studies teachers complements two core units: 1) Time; and 2) Culture: First Nations Roots. The unit also promoted several learning objectives and common essential learnings that are required for Grade 9 Social Studies education, and produced a classroom environment where female and male students could participate in activities, and where stereotypical views that were held by some students could be raised, discussed, and addressed in a non-threatening way.

Data were collected through the administration of interviews, questionnaires, a survey, observations made by the researcher, and students' comments. Following is a presentation of the results of these data.

5.2.1 Results Relevant to the Research Question

Following are excerpts taken from interview and questionnaire responses provided by the suburban high school teachers during the research. These results are relevant to the research question as they describe what the high school teachers require to integrate archaeological concepts, themes and activities into Grade 9 Social Studies curriculum. The teachers reported:

> Way back we used to have some 16 mm films describing early civilizations. I've brought in some Discovery Channel stuff, on the processes of archaeology, middle-eastern archaeology. There is quite a bit out there. There is more on the traditional early first settlements: Asian, western Asian civilizations, African civilizations, Egypt, Mesopotamia. I think you pick up stuff, and they get stuck in the piles, and then you don't use them all the time. As teachers, you use it, it gets stale, and then you chuck it away. It's a question, how much time do you spend on archaeology? Before, I don't think I spent more than 2 or 3 days, as compared to the 2 or 3 weeks we spend now (E. Podborski).

> There is lots of new stuff out there from Time magazine and National Geographic. Archaeological studies done over the past few years, like the Hobbit people from Indonesia, I'd like to somehow use the new information—find a way to use it (R. McLochness).

> "I've noticed a huge difference between September and June kids. The September kids are new and more reserved. By June, they're not shy anymore. They know everyone. Plus, they're ready for a break." (E. Podborski).

"It's better to do the archaeology unit at the beginning of the year. If you do teach your class in a sequential method like I do, and use a timeline, it's kind of nice to do the archaeology unit first" (S. Lambert).

"I think it's great to do it in the first semester, right away, to engage the students right away. I don't know how it works for students at the end of June" (J. Williams).

> Well, actually, I was thinking it would be nice to have one field trip tied to this unit. Maybe we could do it one day, do a field trip and excavate at a real site. Maybe a week worth of classes in grade 9 could be built into one day of the week, and we go there all week, a different class each day, and we could dig and study and learn. It could be an all-day thing. We could lump all their classes to that day. I say, don't second-guess people. We can always ask teachers if they'll participate/cooperate in this (S. Lambert).

> To organize buses to go to Wanuskewin, which is out of town, which takes more time out of class, which costs more money, I don't know. Schools already have a lot

> of time lost because of activities. It's a real difficulty when you take kids out of class—to justify to their teachers their missing classes. If it was the case, then I think it would be limited to grade 9s, because the grade 12s couldn't afford the time to go. The other thing is that if we were going to do that, I would like to see WHP less used by elementary students, because it becomes redundant to go there every year or every several years. Kids don't want to do that. We have to limit the amount of visits to a certain place, so kids don't get that 'Oh, I've been there and done that' attitude. I think adults even get that attitude (R. Groundbreaking).

> Because of transportation and scheduling, it would be very hard to take students on an outdoor field trip. It's very difficult, many obstacles, to involve students in an outdoor educational experience that takes students from the school for more than one day. Taking students from other classes is a challenge too—teachers want them in their classes (E. Podborski).

> I would like to take a class for an afternoon or a day to go to a real site, to see professionals at work. I think it would be a good connection for the kids. Working at our mock site, and then see how it's done in the real world. To make the connection – that here are the people that we're talking about. I'd really like the opportunity to do that (J. Williams).

"I think there's a value in taking kids to a real site. It's just arranging it, to do it in some amount of time. Scheduling is an issue" (R. McLochness).

"I would like to develop my understanding of archaeology more. I want to further my knowledge" (R. Groundbreaking).

> I would love to expand the archaeology unit. The question is how much time do we spend on archaeology? I think the classroom time, the lab, and site reconstruction is good. The excavation/outdoor portion—we spent too much time on it (E. Podborski).

> There has to be partnership between U of S Arch Dept and schools and teachers who want to teach with archaeology. I think it has to happen. We have a teaching site. We have students studying archaeology. Why not use them to help us over here, so at least we are given the right information, the right techniques. And you may foster further archaeologists, further people for your department. This will take time, organization and money commitment. Maybe the archaeology Department could fund some part of it – some tools, some working kits, artifacts created as replicas, to facilitate the teaching of the unit. If the decision is to not participate,

> then we will survive on our own. We will continue. As long as there is commitment from the high school's History Department to do it, then it will go on. And that's another issue. If there is no commitment from our Department, then it might be only one or two teachers, then it might eventually fade. So if we want to see it continue, then I think that partnership with archaeologists and the University [Department of Archaeology] has to be there, and it has to include not just cooperating teachers in charge, but also administration that knows, because administrations change. I think the Saskatchewan Archaeological Society wants to be involved. They should be involved at the site, doing things that also meet their interests as a society. I think it's not just ours. We're doing it. They can be partners too. We got a grant from them. Hopefully we'll continue to receive grants. I think they should come out and watch. I think our school board members should be out here. I think the Director of the School Board should be out here (R. Groundbreaking).

"I think streamlining the experience, making it more precise, would be good. The kids could learn the theory, the techniques, and how to in 10 days to 2 weeks max would be good" (R. McLochness).

> From year to year, just like in any other field, I learn to go and get the more important information out of the abundance of information that's out there. Whether it be with respect to history or any subject I've been teaching. And I think here we need to focus on the key concepts, skills, facts, that they need to know to get the most out of the unit. And not spread ourselves too thin. We also need spare lessons, backup plan for rainy days that I know about ahead of time, so that I don't feel at a loss when I walk into my classrooms and I'm not sure what I'm going to do. This leads to classroom management problems, and then aggravation and then other problems
>
> (S. Lambert).

> It would be ideal if the kids had their own units that no one else dug in. Kids are disappointed when they come to the units they dug in and someone else has dug it and removed the artifacts. That's a bummer for the original group. There's an issue of property, of ownership, for the kids (E. Podborski).

Participant observation was included as a method of collecting data at the suburban high school to capture the behaviour of teachers and students in a natural setting at

specific points during delivery of the lessons. Following are excerpts from the researcher's notes that are relevant to the research question. According to the researcher:

"The teachers reported that they have seen students who are not normally engaged in classroom discussion active in the classroom discussions associated with this Unit."

Teachers demonstrate that they have an innate understanding of the Saskatchewan curriculum. They rarely if ever speak the word 'curriculum'. They seem to know what they need to do with the materials in order to make them curriculum-ready. When I asked one teacher about this observation, she chuckled, and then said to me: 'I used to spend quite a lot of time wondering if I was meeting Curriculum objectives and the like. But now I know it backwards and forwards. I don't have to stop and think about the Curriculum any more. I know how to make the materials fit.

"Teachers require assistance from archaeologists and others who are familiar with completing Saskatchewan Archaeological Society grant applications."

"When setting up the lab, make sure the lab is easily accessible, is near a water source, has enough tables, and good lighting."

"It's best to have two people (at least one archaeologist) assisting with the labwork."

"The film introducing students to basic excavation methods is outdated, which is a distraction for student. It would be a good idea to create a new methods film for teachers and students."

5.2.1.1 Results of the Survey Administered to High School Teachers

In January 2005, the five high school teachers participating in the research at that time were asked to complete a 22-question survey to evaluate the 36 different lessons and activities that constituted the Grade 9 Social Studies Archaeology Unit (see Table 1). (A

total of seven high school teachers participated in the research (during the school term the survey was administered, time constraints prevented one teacher from participating, while the other teacher was on maternity leave). The responses collected from this survey provided data in response to the research question.

For survey questions 1 through 21 (and sub-questions, totalling 36 questions), teachers were asked to select from one of the following measurements to answer each question: √ = this lesson/activity should be included in the archaeology unit, **R** = this lesson/activity should be included as 'rainy day' or backup lessons/activities in the archaeology unit, or **X** = this lesson/activity should be removed from the archaeology unit. Question 22 was to be answered with either a **Yes** or **No** response. Table 1 presents the teachers' responses to the 37 survey questions, with the number in each column representing the number of teachers who selected that response.

TABLE 5.1
Suburban High School Teachers' Survey
Evaluation of the Grade 9 Social Studies Archaeology Unit

Lesson Contents	**√** ***- should be included in the archaeology unit***	**R** ***- should be included in the archaeology unit only as a rained-out or back-up lesson***	**X** ***- should be removed from the archaeology unit***
1. Basic Rules for Archaeological Excavation	5	0	0
2. Key Archaeology Terms	5	0	0
3. Archaeology Quiz (written before excavation)	3	0	2

cont.

4. An Introduction to Archaeology	5	0	0
- What is Archaeology?	5	0	0
- What is an Archaeological Site?	5	0	0
- What do archaeologists find?	5	0	0
- Pre-Contact and Post-Contact Archaeology: What's the difference?	4	1	0
- The tools archaeologists use	5	0	0
- The archaeology crew: Who are they and what do they do?	5	0	0
- Asking and answering research questions. Students create research questions(hypothesizing, the scientific method)	3	2	0
- Why is it important to know about the past?	5	0	0
- Film: The Dig	1	1	3
5. Artifact Show and Tell	5	0	0
- Using the Saskatchewan Archaeological Society's Edu-Kit, and artifacts from the U of S Department of Archaeology and Anthropology			
6. Classification and Interpretation of Artifacts	3	2	0
- Using 2 artifacts presented during the show and tell activity, students work in groups of 2 or 3 and write down a detailed description of each artifact, what they think the artifact is, how it was used, who used it, etc.			
7. Tour of the High School Archaeology Site	5	0	0
- Includes instructing students about what a site and unit consist of, the site and units datum points and why they're established and used, basic methods in archaeological excavation, as well as a hands-on lesson in excavation (how to, and what not to do)			
8. Paleoenvironment of the Northern Plains	3	2	0
- Northern Plains Cultural Chronology: Early (11,500-7,500 BP), Middle (7,500 to 2,000 years BP) and Late (2000 to ~200 years BP) Periods			
9. Changes in tool technology in relation to Northern Plains Cultural Chronology (Early, Middle, Late Cultural Periods)	3	2	0
10. Bison on the Great and Northern Plains	4	1	1
- seasonal migration routes			

cont.

11. Archaeological Sites Around the World:	1	3	1
- Ancient Writing Systems: Mesopotamia, Egypt, China, Phoenicia, Mesoamerica	0	1	4
- Alb-Danube region, Germany: "Star Chart"/pregnancy calendar?	0	1	4
- Brazil: Networks of towns and villages in the Amazon region	0	1	4
- The Maya: Using archaeology to discuss migration and population decline among the Maya of Central America	1	2	2
12. Wanuskewin Heritage Park: - The archaeology of Wanuskewin Heritage Park	2	1	2
13. Film: "The Secrets of Wanuskewin"	0	4	1
14. The Bison: Past and Present - The effects of European contact on the bison and the people of the Northern Plains	5	0	0
15. Descriptions of Bison Hunting - 3 methods: jump, pound and surround	5	0	0
16. The Generous Bison - The importance of the bison to the people of the Northern Plains; a source of food and other supplies (Bison Supermarket activity)	4	1	0
17. Excavation at the High School Site	5	0	0
18. Lab Analysis -Clean, classify and catalogue artifacts recovered during field season excavations at school site	5	0	0
19. Interpretation Activity, based on artifacts (= evidence) recovered from school site	5	0	0
- features/artifacts plotted on a 4' x 5' laminated grid of site	5	0	0
- short, written reports	5	0	0
20. Daily Journals and Final Report, prepared by each excavation group, using daily field records and personal notes	5	0	0
21. Create and Set-up of Archaeology Project Display - put in showcase in front of school's library	5	0	0
22. Do you think a field trip to Wanuskewin Heritage Park should be included in the archaeology unit?	Yes 4 * if well-guided	No 1	

According to these survey results, at least three out of the five teachers responded positively to retaining the following lessons in the Grade 9 Social Studies Archaeology Unit:

- basic rules for archaeological excavation (survey question 1);
- key archaeology terms (survey question 2);
- archaeology quiz (written before the fieldwork) (survey question 3);
- an introduction to archaeology: what is archaeology, what is an archaeological site, what do archaeologists find, pre- and post-contact archaeology of the Northern Plains, the tools archaeologists use, the archaeology crew (who they are and what they do), formulating research questions, and why is it important to know about the past (survey question 4);
- artifact show and tell (survey question 5);
- classifying different types of artifacts (survey question 6);
- tour of the high school archaeology site (survey question 7);
- the paleoenvironment of the Northern Plains (survey question 8);
- changes in tool technology on the Northern Plains (survey question 9);
- bison on the Great and Northern Plains, including season migration, the effects of European contact on the bison and people of the Northern Plains, three bison hunting methods on the Northern Plains, and the importance of bison to Northern Plains people; (survey questions 10, 14, 15, 16);
- fieldwork/excavation at the high school site (survey question 17);

- labwork after excavation (survey question 18);

- interpretation activity (after the fieldwork and labwork), including plotting features and artifacts on a laminated map, and writing short reports on their excavation experience (survey question 19);

- keeping daily fieldwork journals and writing a final report (group work) (survey question 20);

- creation of archaeology display (survey question 21); and,

- a field trip to Wanuskewin Heritage Park (must be well-guided) (survey question 22).

At least three out of the five teachers indicated they did not wish to include the lessons described in survey questions 11, 12, 13 and 14, and wished to include only as backup or rainy day lessons the films *The Dig* and *The Secrets of Wanuskewin*, and the lessons focussing on Mesopotamia, Egypt, China, Phoenicia, Mesoamerica, Germany and Brazil in the amended archaeology unit.

5.2.2 Results Relevant to the Assumptions

Following are excerpts taken from interview and questionnaire responses provided by the high school teachers during the research. These results are referred to to assess the validity of the assumptions taken in the research. According to the teachers:

> I can think of a student, a grade 9 boy who is fairly inattentive in class, and he said himself he did not enjoy the theoretical study of history. But he said himself he did enjoy being out there, in the field, because it was more hands-on, a kinaesthetic experience (S. Lambert).

"Any time you give students a hands-on approach, students who struggle in a more intellectual way, I think they get something good out of archaeology" (E. Podborski).

> I guess if they're not engaged academically, we assume they may be more hands-on. So with this particular archaeology unit, it allows them to use their physicality, their physical abilities, to visualize, to dig, to participate at that level. It also allows those who aren't academically inclined—they can see the importance of what we're doing. And then they can apply with they've learned in class to what they're doing in the field. From my observations, I think test questions that ask kids specifically about how to dig, where to dig, what are the tools, they do well at, because they have first-hand knowledge about that. Questions that go deeper, like what is the effect of climate change, dating methods, these may be more difficult questions because they ask for more memorization. If they're not academically inclined, memorization may be more difficult. But because they were asked to hold a trowel, they will remember the trowel (R. Groundbreaking).

Following are excerpts from data collected by the researcher during observations conducted at the high school. These excerpt are referred to to assess the validity of the assumptions taken in the research. According to the researcher:

"Teachers and students established good rapport and worked very well with the unit supervisors" (high school).

> While we were doing fieldwork, teachers described and pointed out students who were typically less academically and socially engaged in the classroom, and were happy to see how these students were socializing with the other students and were engaged in the fieldwork (high school).

"Showing teachers and students how to dig with a trowel is a much more effective way of communicating how to than explaining or showing a film" (high school).

5.2.3 Results Beyond the Scope of the Research Question and Assumptions

Following are excerpts from Grade 9 Social Studies teachers' interview and questionnaire responses that address issues beyond the scope of the research question and

assumptions, including how at-risk-of-failing and special needs students excelled in the archaeology lessons, the use of the simulated site by teachers/students teaching at/attending other schools, how science, art and teachers of other courses might become involved in archaeology education, the desire to expand archaeology lessons into grade 12 courses (history specifically), and the utility of translating the archaeology lessons into French.

"At-risk-of-failing kids—I had one that passed the class because of archaeology. The effort that they gave, the dedication, helped them to pass the class" (R. McLochness).

> We don't stream students here, and we don't have modified classrooms for ESL [English-As-A-Second-Language] and special needs students. My observation is that we just—they participate, they get treated the same way. If things come up that we need to adjust, we adjust. The expectations regarding the work will be different. Special needs have their own programs, with TA's modifying the materials. But as for actual digging and participation in digging, I don't remember doing anything differently with them. They participated, and we dealt with things as they arose. We didn't treat them any different (R. Groundbreaking).

> The site doesn't belong to any of the teachers. It belongs to the school—the administration and the board, and therefore, as a courtesy to us, if other schools want to use the site, then my first reaction is yes, it could be done. Working out the logistics might be difficult because we are so compliant to time, how much time we have. The other aspect is that the archaeology project is not finished. We want to extend it to Grade 12, and we haven't done that yet in the first three years. So, my inclination would be to move it into the Grade 12 curriculum where they focus on early Aboriginal history and the history of Canada. The only problem is that I don't think we can accommodate too many classes at once, and we don't have enough materials. Having classes at two different levels (different grades) would be difficult. Plus, I don't know if the school board would want to put up any more money. So, if a school came to us and offered to pay for some of the supplies, maybe. But, again, it's not my site. It's the school board's site. They would talk with us, as a courtesy. And the restricted time frame. Plus, we're subject to weather problems. Rescheduling due to rain could make it a problem. The other aspect is to show them what we've done and have them build their own at their school. And … School has a partnership with WHP. That should be extended to all schools in the Catholic system. Other schools could use the GAMAP site too. If they wish for us

to do an in-service, to teach the teachers, then we could use the GAMAP, or use the high school site, or schools could create their own sites (R. Groundbreaking).

Sometimes, I think I'd like to do this unit in grade 12 too, because we cover precontact aboriginal peoples. For example, when we did the lesson on the three ways the aboriginals of the plains hunt bison, it's hard to fit into this unit sometimes. It's out of the blue. It's good for a rainy day, if necessary. I've used it in grade 12, I think (S. Lambert).

I'm far from being an expert in some of the subjects. Often I'm at a loss for an answer. Science, for example, and the dating of artifacts. The carbon thing—I've got to do a little bit more research and learn more on my own. For students, I think it's wonderful. During the course of the day before history class, they might be in science class, and then after, math class. I've always been a proponent of having an interdepartmental approach to teaching. I think it's wonderful. I could go to a science teacher and find out more about a particular topic from them. Or, they could come into my classroom and teach us about carbon dating, for example (S. Lambert).

We're not the science teacher. We're not the English teacher. But we're dealing with human beings and humans do many different things. So, when archaeologists uncover things, there is no way around it. You're going to have integration. Just as I would see a course, if a science teacher was teaching about molecular structure, and he brought in the history or theory of it, I would no see no problem with that—there's nothing wrong with that. The kids get a good understanding about the subject then. Same with Greek mythology. There's no way around it. A good teacher naturally integrates different subjects in the classroom (R. Groundbreaking).

As contemporary teachers, and following the concept of CELs, we are naturally predisposed to the integration of many different disciplines in our day-to-day teachings. In fact, it would be wrong of us to think merely of a discipline that rigidly. To do a formal interdisciplinary approach in that time is a very good idea. Grouping teachers and students together for large blocks of time during the time would be a good idea. To me, that's just good teaching. It's hard for beginner teachers though. They're just trying to meet curriculum content at first. If time was allowed to bring different teachers together, I think we'd been more successful with a formal program of integration. You'd have to dedicate your entire approach to doing that. It takes a lot of time to plan a formal integrated program. The government has not put the resources into this either (E. Podborski).

I think we got the right amount of information. If the computer science teacher wants to use information from archaeology, then that's up to them. I think the art class could become involved too – use our materials for sketches. That's not

> something that would take more of our time, it's something they could do on their own (J. Williams).

"I think you're integrating and connecting all the time when you're teaching history and social studies. These connections just happen because people live multi-dimensional lives" (R. McLochness).

"I think the archaeology lessons have been extremely valuable. I think it would be interesting to hear what students say in grade 12 in response to question like: Why do we have reserves?" (E. Podborski).

"The school division has begun to look at our personal growth plans for each teacher and the schools. I would like to develop the archaeology unit further. I want it to go into grade 12" (R. Groundbreaking).

> It would be interesting to see how Grade 12 students who took social studies and studied archaeology in grade 9 do. Yes, I could also see it in grade 11, in history at the different levels. You'd have to interview those kids, and set up a model. You could take them back to the site, and not say anything to them—just hand them paperwork and equipment and let them go to work, and see what they do. You could take them to a different site, such as Wanuskewin Heritage Park. Give them a quick refresher, and see what the kids remember and how they apply it to what they're seeing at the Park. I think you'd have mixed results with that. You could give them a test early on before they do the First Peoples unit in Grade 12, and see what they know. Give them a bit of a refresher, then give them a test and see how they've applied what they retained from grade 9 archaeology (R. Groundbreaking).

> If I get transferred to another school, I'd like to extend it there, if possible. And then, also at the same time, make sure it continues here, even though I won't be here. The other thing I'd like to do is look at other historical types of things we could do that are hands on. For instance build trenches for WWI, and do mock warfare. I've read of one school that did it. Maybe construct our own assembly line, to teach the industrial revolution (R. Groundbreaking).

> I'd like to continue teaching with archaeology. I need to better educate myself, gather materials, and learn more on the topic, definitely. I don't like to walk in front of the class and not know what I'm talking about. I would like to have a good grip of the logistics of the site, so I can organize students outside better (S. Lambert).

> There's the French aspect as well for me. So far, I've done most of the unit in English, because we have you [the researcher] come in to the classroom, and the other teachers join the class. So it was just easier to teach in English. I would like to have a portion of my French immersion class in French—it's very important to include vocabulary development, so, if anything, one portion of my unit could focus on developing French vocabulary and terminology using archaeology, using definitions, for example. Say you have a list of terminology you have to translate, and then put into context. In the future I would like to translate some of the lesson plans. The first year I translated a bit, but I never got them done. Absolutely. I will definitely have a French component to this unit, definitely (S. Lambert).

> I've heard comments from parents where their kids would come home and talk to them that day about what they did at school—the archaeology—and they didn't talk about any other subject. Will they do that when we cover the Roman Empire? I don't know (J. Williams).

Following are excerpts from the researcher's notes that were collected during observations made at the suburban high school. These excerpts address topics beyond the scope of the research question and assumptions. According to the researcher:

> Special needs students did very well during all phases of the archaeology unit. They were usually the first students who would ask if we were going to dig that day (in the classroom before we went out to the site), and were usually the students who expressed the most disappointment when excavation was cancelled due to inclement weather.

> There is no distinguishable difference between the special needs and other students during the classroom, excavation and labwork activities, with the exception that none of them participated in the creation and set up of the archaeology display.

"Divide the artifacts to be processed before the labwork begin so each student gets to process at least one artifact."

> Remind teachers to read the labwork instructions included in the archaeology unit well in advance of the lab lesson. Then, a day or two before the labwork occurs, ask them if they have any questions, confirm with them the availability of room where the lab will be set up, and that there are enough tables, weigh scales, and the other equipment required.
>
> Teachers had their students sign up (register) for the creation and set up of the display. They took their email addresses so they could inform their students of the dates/times they would be getting together (outside of regular class time) to make posters and put up the display.

"Teachers will provide the poster board, artifacts, photographs, etc. to use for the display."

"It's good to have the archaeology display up when the open house is on—lots of people get to see what is going on at the school."

"The ESL and international students demonstrated a clearer understanding of the importance of how cultural resources can be used to understand the past."

5.2.4 What Grade 9 Social Studies Students Had to Say About Archaeology and Archaeology Education

The researcher also collected data from some of the suburban high school students who participated in the research. Students made the following comments:

"I think that being able to study archaeology by actually going out and digging, is a much greater experience than just doing essays and writing notes."

"If we were to all learn just in class we wouldn't remember anything about archaeology, but since we went and excavated ourselves and as a group, this was a very memorable event that most of us will remember for a very long time."

"The archaeology experience was great! I got to learn more about some people in my class. I also made some new friends. The people in my group were cool!"

"The project made me feel proud and independent."

"My favourite part was that we worked together and that we took turns on each thing that had to be done."

"From this first-hand experience I believe that later in life I can look back and reflect upon this archaeological dig and from that I can say that I got to be a part of an overly fun and educational project during the first few weeks of my grade nine year."

"From this I have learned skills I hope to use in the future and I thank the teachers and assistants for helping me along the way."

The first two excerpts included in this section uphold the validity of the two assumptions assessed in the research.

5.2.5 A Biology Teacher's Thoughts About Archaeology and Archaeology Education

The researcher was involved in conversations and electronic mail communications with several teachers who taught at the suburban high school, but did not participate in the research. Teacher Andrea Regier described how she was interested in how archaeology was being used in the grade 9 social studies course, and how she overheard grade 9 students talk about their archaeology education experiences. Following are excerpts from an electronic mail the researcher received from Mrs. Regier:

> Although I do not teach any grade 9's, the "buzz" that I have heard about the dig site and the analysis that takes place in class has been great. I teach biology 20 and

30, and physics 30 this semester. Some semesters I also teach physics 20. Some possible future connections that the archaeology project could have to these courses are: 1) Biology 30 – Evolution unit – an examination of human skulls through the ages to establish the changes that took place in evolution. Perhaps at a dig site, students could uncover human remains, and given the characteristics of the bones of the skeleton and the appearance of the skull, they could sex the individual and provide an approximate range of dates for the bones. The uncovering of artwork could lead to a discussion of what importance the production of artwork has in the development of culture (Cro-Magnons vs. Neanderthals): Uncovering the bones of creatures with homologous structures (ie, the wing of a bird and arm of a human) could lead students to discover the similarities in structure and therefore the fact that such creatures may have a common ancestor. Genetics unit – DNA extraction from remains and a discussion of the analysis that might follow to date the organism; 2) Physics 30 – Nuclear Physics unit – Radioactive carbon dating in action! A discussion of (and possibly someday participation in) the dating of carbon-based remains given the radioactivity of the C atoms. A discussion of how new technologies, like the synchrotron (Canadian Light Source)…could allow for more in-depth analysis of archaeological remains due to its ability to produce detailed images (Andrea Regier, personal communication 2005).

The impact of the archaeology unit clearly went beyond the grade 9 social studies classrooms.

5.3 Summary of the Results According to the Data Collected At Both Schools

As regards the research question, analysis of the results reveal that the Grade 6 Science and Grade 9 Social Studies teachers identified 21 resources, supports or issues for consideration that they require to integrate archaeology concepts, themes and activities into Grade 6 Science and Grade 9 Social Studies curricula, including lessons that:

- meet Saskatchewan Core Curriculum learning objectives;
- include answer keys;
- focus on First Nations, Métis and Northern Plains-based content, for pre- and post-European periods;

- include handouts for students that provide definitions, key terms and other explanatory notes, diagrams and images;
- involve the use of different types of evaluative student assignments including book reports, poetry, short stories, and drawings;
- can be easily adapted and integrated into existing curricula;
- do not require a great amount of pre-delivery preparation;
- are designed to be complementary to and make use of the different types of technological equipment available to teachers involved in the archaeology education programs;
- can be delivered early in the school year or term, within a two-week time period;
- employ different teaching methods including direct instruction, storytelling, videos, group work and classroom discussions;
- include a collection of up-to-date archaeology-related resources, maintained in a central location at the school, that provide background and supplementary information for each lesson in the archaeology unit, and archaeology in general;
- provide a list of easily-accessible archaeology education resources (not located at the school) that teachers can refer to and incorporate into the delivery of the archaeology lessons (ie, films, magazine and journal articles, textbooks, web sites, archaeological sites, contact information for avocational and professional archaeologists (speakers list));
- are translatable/translated into French; and
- include an optional post-unit field trip to a nearby archaeological site;

and include or provide:

- provision for avocational and professional archaeologists to assist with grant writing;
- commitment and support of school principals and school board representatives/ administrators;
- information about professional development opportunities that focus on archaeological content and activities;
- an informal/formal partnership with a local university archaeology department and archaeology societies/organizations;
- provision outside assistance in acquiring materials (to serve as artifacts/features) to be used (buried) at the mock site, as well as artifacts and displays to be used during the classroom lessons;
- the assistance of avocational and professional archaeologists with site preparation, excavation, and labwork; and,
- include an updated recording (video/digital) of basic excavation methods.

As they concern the two assumptions taken early in the research, the results of the data upheld their validity, and confirmed that the inclusion of hands-on, active learning that include aspects of constructivist theories of learning, including Piaget's cognitive development theory and Vygotsky's sociocultural theory, lead to the development of good quality archaeology education materials.

Results of the research extended beyond the scope of the research question and assumptions, and addressed issues including:

- Grade 6 Science teachers request for lessons that include more handouts and less note-taking for their students;

- at-risk students benefiting through their participation in archaeology education, in one case to the extent that the student passed Grade 9 Social Studies because of his performance in the archaeology unit;

- ESL and special needs students' enthusiasm and excellent academic performance during the teaching of the archaeology unit;

- teachers discussing the possibility of having science teachers come into their classrooms during the teaching of the archaeology unit to teach about such things as chemical composition and other science topics (team-teaching); and,

- teachers being told by parents that their children would talk about their experience with archaeology education at the supper table (teachers told the researcher they rarely receive this kind of feedback from parents).

Chapter 6 reflects on the results, and presents conclusions based on these reflections.

6. Discussion and Conclusions

As described in the first chapter, the aims of the research were to answer the research question: What do teachers require to integrate archaeology concepts, themes and activities into Grade 6 Science and Grade 9 Social Studies curricula?, and to test the reliability of two assumptions that were made during an early phase of the research: 1) If successful archaeology education programs in North America employed the use of hands-on, active learning, then the inclusion of hands-on, active learning in the archaeology education resources developed for the research will also prove effective ; and 2) If successful archaeology education programs in North America incorporated constructivist theories of learning, including the cognitive development theory of Jean Piaget and the sociocultural theory of Lev Vygotsky in their designs, then reference to constructivist theories of learning, including Piaget's cognitive development theory and Vygotsky's sociocultural theory, will result in the development of successful archaeology education materials. This chapter presents a discussion of the results as presented in the previous chapter as they pertain to the research question and assumptions, and draws conclusions based on this discussion.

6.1 Discussion of Results Relevant to the Research Question

According to the results described in the previous chapter, the teachers who participated in the research faced similar issues and required similar resources and supports as they integrated archaeological content, themes and activities into Grade 6 Science and Grade 9 Social Studies curricula. According to the results of the research,

teachers identified 21 resources, supports or issues for consideration that they require to integrate archaeology concepts, themes and activities into Grade 6 Science and Grade 9 Social Studies curricula. Teachers require lessons that:

- meet Saskatchewan Core Curriculum learning objectives;
- include answer keys;
- focus on First Nations, Métis and Northern Plains-based content, for pre- and post-European periods;
- include handouts for students that provide definitions, key terms and other explanatory notes, diagrams and images;
- involve the use of different types of evaluative student assignments including book reports, poetry, short stories, and drawings;
- can be easily adapted and integrated into existing curricula;
- involve the assistance of avocational and professional archaeologists with site preparation, excavation, and labwork.
- do not require a great amount of pre-delivery preparation;
- are designed to be complementary to and make use of the different types of technological equipment available to teachers involved in the archaeology education programs;
- can be delivered early in the school year or term, within a two-week time period;
- employ different teaching methods including direct instruction, storytelling, videos, group work and classroom discussions;

- include provision outside assistance in acquiring materials (to serve as artifacts/features) to be used (buried) at the mock site, as well as artifacts and displays to be used during the classroom lessons;

- include a collection of up-to-date archaeology-related resources, maintained in a central location at the school, that provide background and supplementary information for each lesson in the archaeology unit, and archaeology in general;

- provide a list of easily-accessible archaeology education resources (not located at the school) that teachers can refer to and incorporate into the delivery of the archaeology lessons (ie, films, magazine and journal articles, textbooks, web sites, archaeological sites, contact information for avocational and professional archaeologists (speakers list));

- are translatable/translated into French;

- include an optional post-unit field trip to a nearby archaeological site;

- include provision for avocational and professional archaeologists to assist with grant writing;

- have the commitment and support from school principals and school board representatives/administrators;

- information about professional development opportunities that focus on archaeological content and activities,

- involve an informal/formal partnership with a local university archaeology department and archaeology societies/organizations; and,

- include an updated recording (video/digital) of basic excavation methods.

For the purpose of this discussion, the resources and supports teachers require are placed into one of three categories: 1) content; 2) delivery; and 3) additional, with each category list followed by a discussion of each resource and support listed.

6.1.1 Content of Archaeology Units: What Teachers Require to Teach With Archaeology

According to the results of the research, the content of the archaeology education lessons should:

- meet Saskatchewan Core Curriculum learning objectives;
- include answer keys;
- focus on First Nations, Métis and Northern Plains-based content, for pre- and post-European periods;
- include handouts for students that provide definitions, key terms and other explanatory notes, diagrams and images; and,
- include a variety of evaluative student assignments including book reports, poetry, short stories, and drawings.

Early planning meetings with teachers provided the researcher with an understanding of the need to develop teaching materials that included content that met Saskatchewan Core Curriculum learning objectives, and focussed on Canadian First Nations' and Métis history. What these meetings did not prepare the researcher for, however, was teachers' requirement for answer keys, student handouts, and the inclusion of different types of assignments that teachers could use to evaluate students' progress in the archaeology unit. It was during the course of teaching the lessons, and through responses shared by teachers to interviews and questionnaires, that the researcher became

aware of the need for and was able to develop and provide these resources and supports to teachers.

6.1.2 Delivery of Archaeology Units: What Teachers Require to Teach With Archaeology

According to the results of the research, teachers required the following seven attributes in the archaeology education units:

- lessons can be easily adapted and integrated into existing curricula;
- in the case of the suburban high school, the assistance of avocational and professional archaeologists in site preparation, excavation, and lab work.
- lessons that do not require a great amount of pre-delivery preparation;
- lessons that are designed to be complementary to and make use of the different types of technological equipment available to teachers involved in the archaeology education programs;
- lessons that can be delivered early in the school year or term, within a two-week time period;
- lessons that employ different teaching methods including direct instruction, storytelling, videos, group work and classroom discussions; and,
- materials to be used (buried) at the mock site, and artifacts for lessons.

It was anticipated that the results of the research would reflect teachers' need for lessons that could be easily adapted and integrated into existing curricula, and indicate the need for assistance from archaeologists in the development and delivery of these

lessons. After all, it was the request for teaching materials and assistance of this nature that was among the motivations that led to this action research (see 2.1, 4.7 and 4.8).

Much has been said and written by archaeologists over the past several decades about their ethical responsibilities, including the obligation to involve the many publics that exist in the work they do (see 1., 2.3.1, 3.1 and 3.2). However, in order for archaeologists to be in a position to establish and maintain such partnerships, they must be cognizant of the role(s) that they will play within this partnership, and also of the need for specialized training

Teachers require the assistance of archaeologists in order to develop and deliver high-quality archaeology education materials, and archaeologists require public support for the work that we do. Teachers and archaeologists acknowledge and accept these realities. When archaeologists assist teachers in the development and delivery of archaeology educational programs, they are meeting not only their professional responsibilities, but are also providing support and resources that are vital to the development and delivery of successful archaeology education initiatives.

As described in 3.4, archaeologists and teachers operate within two very different worlds, with unique goals and unique approaches to achieving goals. When a teacher collaborates with an archaeologist in the development of curricula, an atmosphere is created where both the teacher's and the archaeologist's expertise and contribution is valued, and they are both shareholders and stakeholders in the partnership as their investment will likely yield positive returns. The fostering of such a relationship among the teacher and archaeologist encourages greater acceptance of each other's goals, and leads to a greater possibility that the archaeology teaching resources that have been

developed will be used by other teachers, as they are seen as the product of a collaboration involving teachers, rather than a product that was created and imposed upon them by an outsider.

One way archaeologists can increase public outreach is through the development and implementation of university archaeology curricula that includes courses in cultural resources management and internship opportunities for undergraduate and graduate archaeology students. Curricula of this nature goes beyond what we see in the typical university classroom, and provide undergraduate and graduate archaeology students with information and training that provides them with the knowledge and skills to effectively communicate information about the past with the many publics that exist, in whatever form that communication may take, from public presentations to the development of archaeology-based curricula.

As it regards the third need identified in this section, the researcher's observations were consistent with teachers' responses that they have a little time to spend preparing lessons. This being the case, user-friendly archaeology lessons must include content that is clear and concise, include a descriptive title, specify the amount of time required to deliver the lesson, provide a detailed description of the activity(ies) involved in the lesson, include a list of materials that are required to teach the lesson as well as where the materials can be obtained, provide suggestion for instructional method(s), include references to the specific Curriculum standards and objectives the lesson meets, and provide suggestion for method(s) of evaluation.

Teachers also indicated they have limited time to spend on pre-delivery preparation of the archaeology lessons. Section 6.1.3 discusses the issue of professional development for teachers.

The researcher learned early in the research that not all schools are created equally, and that some are better equipped than others with computer and other audio-visual and technological devices. The archaeology unit developed for the Grade 6 Science teachers and students at the inner-city elementary school consisted of hard-copy documents and overheads, while the lessons that comprised the Grade 9 Social Studies archaeology unit developed and delivered at the suburban high school included hard-copy documents and overhead, as well as compact discs which teachers would use for desktop applications (Microsoft Word and Power Point). In the case of the high school, the researcher was able to utilize digital images and interesting visual presentations, making the daily lessons more dynamic and visually engaging for the students. It is necessary for archaeology educators to know in advance what equipment teachers have access to, and then design the archaeology education materials in a way that makes the best use of available equipment.

Teachers indicated a preference to teach the archaeology unit in September, or early in the second term (which would rule out the possibility of an outdoor excavation at schools in Saskatchewan). Reasons cited by teachers include the more reserved nature of students early in the school year and fewer classroom control issues (consistent with behaviour the researcher observed in students), that a September delivery works best for teachers who adopt a sequential method of teaching units where timelines are used to reinforce events in time and space, and

that archaeology education serves to "engage the students right away" (J. Williams) in the school, and keep them engaged throughout the term and the remainder of the school year.

Teachers also expressed the need to limit the time spent delivering the archaeology unit to two weeks in order to provide them the time they require to teach other lessons/units to meet the Curriculum's Required Areas of Study for Grade 6 Science and Grade 9 Social Studies courses.

In order to promote and maintain students' interest in the course content, and in accord with contemporary theories on curriculum development, the design of the archaeology units incorporated different methods of instruction, including direct instruction, predict-observe-explain, discussion, concept formation, inquiry, group work and a field trip. Providing teachers with suggestions for methods of instruction should be done with care, however, as teachers are trained, experienced, and possess an innate ability to deliver lessons effectively. While the first drafts of the archaeology units included suggestions for methods of instruction, these references were removed in the final versions as the researcher concluded that they were not required by teachers.

As described in 4.8, the archaeology unit delivered at the suburban high school included excavation at a mock site that was built on the school's property. During planning meetings, the researcher and teachers confirmed that the composition of the site would include pre- and post-European contact components containing remains similar to what is typically found at similarly-dated sites on the Northern Plains (see 4.8.3). Such a plan required the compilation of a list and also materials to build such a site. A list of required materials was generated by the researcher, and provided to the teachers

approximately one month before the site was built in order to provide teachers sufficient time to collect the materials. The list of materials included lithic material (flakes of various sizes and composition), potsherds, crushed brick, ash/charcoal, beads, nails, fragments of bone china, and a variety of species of faunal materials (including an articulated deer vertebrae that a teacher had picked up as road-kill and dried and cleaned in his back yard). Figures 4.4 and 4.5 provide visual perspectives of the composition of the mock site built at the suburban high school.

6.1.3 Additional Resources and Supports Teachers Require to Teach With Archaeology

The results of the research indicate that teachers required materials and supports that went beyond aspects of content and delivery, including:

- a collection of up-to-date archaeology-related resources, maintained in a central location at the school, that provide background and supplementary information for each lesson in the archaeology unit, and archaeology in general;
- a list of easily-accessible archaeology education resources (not located at the school) that teachers can refer to and incorporate into the delivery of the archaeology lessons (ie, films, magazine and journal articles, textbooks, web sites, archaeological sites, contact information for avocational and professional archaeologists (speakers list);
- lessons that are translatable/translated into French;
- units that include an optional post-unit field trip to a nearby archaeological site;
- avocational and professional archaeologists to assist with grant writing;

- commitment and support from school principals and school board representatives/administrators;

- access to professional development opportunities that focus on archaeological content and activities;

- informal/formal partnership with a local university archaeology department and archaeology societies/organizations; and,

- an updated recording (video/digital) of basic excavation methods suitable for teacher and student use.

The two inner-city elementary school teachers who participated in the research were each given a copy of the entire archaeology unit plan developed for their use (see Appendix E), including all handouts and overheads, and assumed responsibility for updating the unit with revised lessons, handouts and overheads as they were produced by the researcher (from first draft to final version). The suburban high school teachers preferred to do things a bit differently than the elementary teachers, and kept and maintained (with revised versions of lessons) a hard copy and compact disk containing the entire archaeology unit in the classroom of the head of the History Department, with the understanding that they had reasonable access to the lessons and could use and reproduce them as they required.

The archaeology unit developed for Grade 9 Social Studies included a list of teachers' resources relevant to each lesson, as well as a bibliography at the end of the unit that provided teachers with additional information on relevant publications they could borrow from libraries, archaeological societies, and other sources.

One of the teachers from the suburban high school (S. Lambert) involved her French Immersion students in the archaeology education. She prepared for the delivery of the archaeology unit by translating as many of the lessons as she could into French, delivering them in French, and then having the researcher come into the classroom and deliver those lessons that involved hands-on instruction (i.e., artifact show and tell) and were more difficult for her to translate into text, and then translated into French (on the fly) what the researcher said during the lesson. The French teacher told the researcher that she would appreciate having access to abstracts written in French that describe significant archaeological finds and sites, and recent archaeological research.

Results of the research also indicate that while the suburban high school teachers want to include a field trip in the archaeology unit, it must be well-guided, affordable, and within close proximity (less than one hour drive) from the school (see question 22 in Table 5.1, and 5.2.1.1). Teachers also spoke of the possibility of students who have participated in the archaeology education being able to participate in summer excavation projects at a nearby site.

Results of the research also indicate that the suburban high school teachers require assistance with the preparation of grant applications. The researcher provided assistance to the suburban high school teachers when they applied for a grant to cover some of the costs associated with replacement of excavation equipment and preparation of the site. While the teachers did retain a photocopy of the entire grant application, and were successful in their grant application, their responses to interview and questionnaire queries suggest they would require assistance with this task in the future.

Teachers indicated the need for the support of school principals and board representatives/administrators for the researcher and for the integration of archaeological content into curricula in the future. The principals and board administrators associated with the two schools that participated in the research supported the research, in principle and financially.

Among the challenges of professional archaeology is the need for increased public outreach, including working with teachers who are interested in teaching with archaeology. Professional and avocational archaeological associations across North America have included in their mandates the development of teacher resources (i.e., artifact displays and films) and training programs (specialized professional development opportunities) where teachers can gain hands-on experience working with archaeologists in the field and in the lab. Such opportunities are available to Saskatchewan teachers through summer public programming offered by the Saskatchewan Archaeological Society. Teachers could also learn more about archaeology by becoming a member of one of their local archaeological societies through membership with the Saskatchewan Archaeological Society. The schools that participated in the research have both benefited through their association with the Saskatchewan Archaeological Society. Teachers and schools with memberships in archaeological associations, and those who are able to participate in summer fieldwork courses designed for educators return to their classrooms in the fall with a better understanding of the ancient past, as well as new ideas and educational resources that they can use to spark students' interest. Archaeologists can take advantage of opportunities to participate/present at teacher in-services held during teachers' conventions. Such venues present an excellent opportunity for archaeologists

and teachers to come together to discuss common goals and explore how to make the best use of each others' expertise and assets.

Teachers and students can benefit richly through partnerships with university archaeology departments and archaeological organizations. Professional and avocational archaeologists should seek out teachers and schools that are interested in and are suitable for informal and formal partnerships.

6.2 Discussion of the Results Relevant to the Assumptions

> The difference between real 'education' and simply telling people things you want them to know is that real education seeks the personal handles of individuals it wants to instruct, and leads them to make a personal connection with, and a personal acquisition of, the information (Blanchard 1996:15).
>
> Instead of merely trying to impart information, the teacher should consider designing experiences that allow the student to actively structure the subject being taught, by questioning, experimenting, and discovering facts and relationships among them (Onderdonk 1986:80).
>
> "Tell me and I forget, teach me and I remember, involve me and I learn."
> Benjamin Franklin (http://www.quotiki.com/quote.aspx?id=10324)

Two assumptions were made after the literature was reviewed that spoke to the notion that the context or setting in which teaching and learning take place plays an integral role and influences student comprehension, meaning-making and cognitive growth.

Piaget's theory on the processes of cognitive development (see 2.6.1) is relevant to archaeology education as it regards the design of archaeology education materials. For example, taking into consideration Piaget's four stages of cognitive development and the design of archaeology education materials, for the Grade 6 Science students (who are presumably at stage 3 of Piaget's universal stages of cognitive development), the

inclusion of concrete operations in curricula promotes logical thinking. Lessons involving activities and concepts of classification and relations, spatial relationships, time, movement, conservation, and measurement also come into play at this third stage. The use of artifacts is also complementary to this stage of cognitive growth. As it regards Piagetian theory and Grade 9 Social Studies students, (who are presumably at stage 4, formal operations), this stage involves abstract thinking. At each of the four stages, students gain confidence in the process, and are further motivated to continue questioning, analyzing and interpreting (reflective thinking). This being the case, Piaget's theory on cognitive development was considered complementary to and therefore influenced the design of the archaeology resources developed and delivered in the research.

Learning occurs when a teacher and a student are involved in a social interaction that includes verbal communications that are meaning-centred, and motivate and support the student as they move past being a passive recipient of information to becoming a meaning-maker.

According to a Vygotskian framework, true learning occurs when a *novice* (of any age), through the guidance of an *expert*, is able to proceed through their zone of proximal development, and reach higher levels of cognition as they consider and accept new information that challenges previously-held understandings, and allows them to scaffold and reach higher levels of understanding, ability and cognition (see 2.6.2). Working within a Vygotskian framework, the goal of the researcher was to collaborate with the teachers in the development and delivery of archaeology lessons that would create opportunities for the *expert/novice* interaction that would take both teachers and students

beyond what they could accomplish independently, to what they could accomplish with assistance or under guided discovery (into the zone of proximal development).

The use of artifacts and cultural resources provided teachers and students with direct evidence, and provide them with a direct link to the past. When a teacher is able to provide their students with an opportunity to touch and hold an artifact, or to be involved in an active excavation or labwork (whether as a participant or a visitor to an archaeological site), they are involving their students in an active and participatory learning experience, where something tangible and relevant is extended to the student, engaging them both in meaningful teaching and learning.

Results of the research indicated that students who were not usually engaged in classroom work (for social or academic reasons) were engaged and fully participant in all the archaeology lessons, whether they involved classroom instruction, group work, or hands-on activities. The students also demonstrated their commitment to their excavation group, and displayed a sense of ownership over their units and site (students reported to the researcher and teachers that they would drop by the site during weekday evenings and on weekends to make sure the site was secure).

6.3 Conclusions

The outcomes of this research benefit the professions of education and archaeology.

The experiential, participatory, hands-on approach followed in the research provided participants with exciting and memorable teaching and learning experiences that met Saskatchewan Core Curriculum standards and objectives. The concepts, themes and activities associated with the archaeology units also encouraged and supported positive social interactions among teachers and students, and provided them with opportunities to

see, touch and work with artifacts in situated environments (the archaeology site and the lab), which enhanced the teaching and learning of science and social studies lessons. Also, teachers now have access to appropriate, archaeology-based lessons and unit plans that they can integrate into Grade 6 Science and Grade 9 Social Studies courses.

With regards to the benefits to archaeology, the students and teachers who participated in the research know about Saskatchewan's pre- and post-European contact histories, they understand the importance of context and method in archaeological practice, and they appreciate why it is important and necessary to protect and conserve cultural resources.

The results of the research, teachers' recognition of the value of integrating archaeological content into natural and social science curricula, and archaeologists' desire to involve teachers and students in archaeology education projects should lead curriculum writers to consider including archaeology as at least an optional unit in natural and social studies courses in future revisions of the Saskatchewan Core Curriculum. In order for this to occur, archaeology educators will have to communicate and establish working relationships with those involved in curriculum development and reform in the province.

The main goal of the research was to determine what teachers require to integrate archaeology concepts, themes and activities into Grade 6 Science and Grade 9 Social Studies curricula. Teachers identified 21 resources, supports or issues for consideration that they require to integrate archaeological content into these courses. With this information in hand, it is incumbent upon archaeologists involved in public outreach through education to collaborate with teachers to provide them what they require to teach with archaeology.

7. Recommendation for Future Research

While the results of the research have allowed the researcher to draw conclusions with respect to the question asked and assumptions taken, there is potential for the outcomes of this research to also be applied to future research in consideration of the question: Has students' involvement in archaeology education in grade 6 science or grade 9 social studies influenced or contributed to their comprehension and performance in other courses?

8. REFERENCES

Anyon, Jean
1980 Social Class and the Hidden Curriculum of Work. *Journal of Education* 162(1):67-92.

Ashmore, Pamela and Timothy Baumann
2003 Teacher's Corner: Archaeology for the Classroom. In AnthroNotes, Museum of Natural History Publications for Educators 24(1):9-18. Smithsonian Institution, Anthropology Outreach Office, Washington, DC. Electronic document, http://www.nmnh.si.edu/anthro/outreach/anthnote/anthback.html, accessed October 20, 2003.

Barakett, Joyce and Ailie Cleghorn
2000 *Sociology of Education, An Introductory View from Canada*. Prentice Hall Allan and Bacon Canada, Scarborough, Ontario.

Bender, Susan J. and George S. Smith (editors)
2000 *Teaching Archaeology in the Twenty-First Century*. The Society for American Archaeology, Washington, D.C.

Black, Deborah
2000 *Hunting Tools Teacher Information*. People in Their World series. D. Black Communications Inc., Saskatoon, Saskatchewan.

2001 *Bison Supermarket Teacher Information.* People in Their World series. D. Black Communications Inc., Saskatoon, Saskatchewan.

Blanchard, Charles
1996 Can The Value Of The Past Really Be Taught? *Archaeology and Public Education* 6(2):6, 15.

Bodner, George
1986 Constructivism: A Theory of Knowledge. *Journal of Chemical Education* 63(10):873-878.

Boland, Dale E., Michelle Schatz, and Christine Cluney
2001 Broken Bottles and Bison Bones: Public Archaeology at Fish Creek Provincial Park, Calgary, Alberta. Paper presented at the 33rd Annual Meeting of the Canadian Archaeological Association.

Boutilier, Brenda, Paul Erickson, Denise Hansen, and David Williamson
1992 *Discovering Archaeology, An Activity Book for Young Nova Scotians*. Nova Scotia Archaeology Society, Halifax.

Brewer, John and Albert Hunter
2006 *Foundations for Multimethod Research.* Sage Publications, Inc., Thousand Oaks, CA.

Brown, John S., Allan Collins, and Paul Duguid
1989 Situated Cognition and the Culture of Learning. *Educational Researcher* 18(1):32-42.

Caduto, Michael J. and Joseph Bruchac
1989 *Keepers of the Earth*. Fifth House Publishers, Saskatoon. Saskatchewan.

Cameron, Barbara J.
1995 *Heritage Education At Two Aboriginal Cultural Centres: A Case Study*. A Master of Education Qualifying Research Paper submitted to professors Joel Weiss and Barbara Burnaby of the Ontario Institute for Studies in Education.

Canadian Archaeological Association
1997 Principles of Ethical Conduct / Public Outreach and Education Committee. Electronic documents, http://www.canadianarchaeology.com, accessed October 24, 2003.

Canadian Museum of Civilization
2008 An Ancient Bond with the Land, Communal Hunters, The Staff of Life, drawing by Susan Laurie-Bourque. Electronic document, www.civilization.ca/aborig/fp/fpz3b06e.html, accessed August 2008.

Carman, John
2001 *Archaeology and Heritage: An Introduction*. Continuum, London, United Kingdom.

Chambers, Cynthia
1999 A Topography for Canadian Curriculum Theory. *Canadian Journal of Education* 24(2):137-150.

Chiarulli, Beverly A., Ellen Dailey Bedell, and Ceil Leeper Sturdevant
2000 Simulated Excavations and Critical Thinking Skills. In *The Archaeology* Education Handbook, Sharing the Past with Kids, edited by Karolyn Smardz and Shelley J. Smith, pp. 217-233. Altamira Press, Walnut Creek, California

Christensen, C. Roland, David A. Garvin, and Ann Sweet
1991 *Education for Judgment: The Artistry of Discussion Leadership*. Harvard Business School Press, Boston, Massachusetts.

Coffey, A. and P. Atkinson
1996 Making sense of qualitative data: Complementary research strategies. Sage Publications, Thousand Oaks, CA.

Cotter, John L.
1979 Archaeologists of the Future: High Schools Discover Archaeology. *Archaeology* 32(1):29-35.

Creswell, John W.
2005 Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research. Pearson Education, Inc., Upper Saddle River, NJ.

Dale, J.
2000 Situating Archaeology Education: The Relevance of Socio-Cultural Theory in Developing Public Archaeology Programs. Electronic document, http://www.educ.sfu.ca/archaeology/theorypaper.html, accessed August 12, 2003.

Danien, Elin
1996 Public Relations: It's More than "No Comment." *Society for American Archaeology Bulletin* 14(4):5.

Davis, M. Elaine
2000 Archaeology education and the political landscape of American schools. *Antiquity* 74:194-198.

2005 *How Students Understand the Past: From Theory to Practice.* AltaMira Press, Walnut Creek, California.

Davis, Hester A.
1971 Is There A Future for the Past? *Archaeology* 24:300-306.

1972 The Crisis in American Archaeology. *Science* 176:267-272.

1999 The Life and Times of Bettye J. Broyles: I Did a Man's Job for Thirty Years. In *Grit-Tempered: Early Women Archaeologists in the Southeastern United States*, edited by Nancy Marie White, Lynne P. Sullivan, and Rochelle A. Marrinan, pp. 115-147. University Press of Florida, Gainesville, Florida.

DeCicco, Gabriel
1988 A Public Relations Primer. *American Antiquity* 53:840-856.

De Cunzo, Lu Ann and John H. Jameson, Jr. (editors)
2005 Unlocking the Past: Celebrating Historical Archaeology in North America. University Press of Florida, Gainesville.

Devine, Heather
1991 The Role of Archaeology in Teaching the Native Past: Ideology or Pedagogy? *Canadian Journal of Native Education* 18(1):11-22.

Ellick, Carol
1990 Archaeology for the Classroom. *Archaeology and Public Education* 1(2):10-11.

Fagan, Brian M.
1994 Perhaps We May Hear Voices…. *Save the Past for the Future II, Report of the Working Conference*, pp. 25-30. Society for American Archaeology, Breckenridge, Colorado.

1999 Foreward. In *The Ethics of Collecting Cultural Property*. 2nd ed, pp. xvii-xx. University of New Mexico Press, Albuquerque.

2005 *A Brief History of Archaeology: Classical Times to Twenty-First Century.* Pearson Prentice Hall, Upper Saddle River, New Jersey.

2006 *Archaeology: A Brief Introduction.* 9th ed. Pearson Prentice Hall, Upper Saddle River, New Jersey.

Fagan, Brian M. and Christopher R. DeCorse
2005 *In the Beginning: An Introduction to Archaeology*. Pearson Prentice Hall, Upper Saddle River, New Jersey.

Federation of Saskatchewan Indian Nations and the Saskatchewan Indian Cultural Centre
1992 *Practising the Law of Circular Interaction, First Nations Environment and Conservation Principles.* A joint project of the Federation of Saskatchewan Indian Nations and the Saskatchewan Indian Cultural Centre. Saskatchewan Publishers Group, Regina, Saskatchewan.

Fedorak, Shirley A.
1994 Is Archaeology Relevant? An Examination of the Roles of Archaeology in Education. Published Master's thesis, Department of Anthropology and Archaeology, University of Saskatchewan, Saskatoon. Special Collections, Main Library, University of Saskatchewan.

Ferraro, Gary
2004 Cultural Anthropology: An Applied Perspective. 5th ed. Wadsworth Nelson, Toronto, Canada.

Fladmark, Knut R.
1978 *A Guide to Basic Archaeological Field Procedures.* Department of Archaeology, Simon Fraser University, Publication Number 4. Burnaby, British Columbia.

Foot, Richard
2005 Education system failing students when it comes to history. *The StarPhoenix* 11 November:B8. Saskatoon.

Friedman, Ed
2000 Preface. In The Archaeology Education Handbook, Sharing the Past with Kids, edited by Karolyn Smardz and Shelley J. Smith, pp. 13-16. Altamira Press, Walnut Creek, California

Gallavan, Nancy P.
2001 Four Lessons That Integrate Math and Social Studies. *Social Studies and the Young Learner* 13(3):25-28.

Gelburd, Diane E.
1990 Educating the Public. *CRM Bulletin*13(6). Electronic document, http://crm.cr.nps. gov/issueindex.cfm , accessed July 15, 2003.

Glaser, B. and A. Strauss
1967 The Discovery of Grounded Theory. Aldine Press, Chicago.

Glatthorn, Allan A. and Randy L. Joyner
2005 *Writing the Winning Thesis or Dissertation*. 2nd ed. Corwin Press, Thousand Oaks, California.

Grace Adam Metawewinihk Archaeological Project
1995 to 2004 *Interim Reports.* Made available by Dr. Chris Foley and Laura Foley, GAMAP Directors.

Green, Lesley F., David R. Green, and Eduardo G. Neves
2003 Indigenous Knowledge and Archaeological Science: The Challenges of Public Archaeology in the Reserva Uaçá. *Journal of Social Archaeology* 3(3):366-398.

Hawkins, Nancy W.
1991 *Classroom Archaeology, An Archaeology Activity Guide for Teachers.* Third edition. Division of Archaeology, Office of Cultural Development, Department of Culture, Recreation and Tourism, State of Louisiana, Baton Rouge, Louisiana.

Helgason, Gail
1987 *The First Albertans.* Lone Pine Publishing, Edmonton, Alberta.

Henson, Don, Peter Stone, and Mike Corbishley (editors)
2004 *Education and the Historic Environment*. Routledge, London, United Kingdom.

Herscher, Ellen
1989 A Future in Ruins. *Archaeology.* January/February:67-70.

Holm, Karen A. and Patricia J. Higgins
1985 *Archaeology and Education: A Successful Combination for Precollegiate Students*. Anthropology Curriculum Project, The University of Georgia, Athens, Georgia.

Howe, Anne C.
1996 Development of Science Concepts Within A Vygotskian Framework. *Science Education* 80(1):35-51.

Jackson, Philip W.
1968 The Daily Grind. *Life in Classrooms*. Holt, Rinehart and Winston, New York, NY.

Jameson, John H. Jr.
1994a Public Education: An Emerging Emphasis In The Practice of Archaeology. *Archaeology and Public Education* 4(4):1, 11.

1994b The Importance of Public Outreach Programs in Archaeology. *Society for American Archaeology Bulletin* 12(3):16-17.

1997 *Presenting Archaeology to the Public: Digging for Truths*, editor. Altamira Press, Walnut Creek, California.

2003 Purveyors of the Past: Education and Outreach as Ethical Imperatives in Archaeology. In *Ethical Issues in Archaeology*, edited by Larry J. Zimmerman, Karen D. Vitelli, and Julie Hollowell-Zimmer, pp. 153-162. Altamira Press, Walnut Creek, California.

Jeppson, Patrice L.
2000 An Archaeologist/Educator Collaboration: Lessons learned during a year of archaeology in the Baltimore County Public Schools. Electronic document: http://www.p-j.net/pjeppson/AAA2000/Papers.shaJeppson1.htm, accessed April 25, 2005.

2001 Pitfalls, Pratfalls, and Pragmatism in Public Archaeology. Electronic document, http://www.p-j.net/pjeppson/SHA2001/Papers/Jeppson.htm, accessed December 26, 2003.

2003 Learning from the 2003 SHA Public Session's PEIC K-12 Social Studies Education Event: What can be taken forward from this Public Archaeology experience? Electronic document, http://www.p-j.net/pjeppson/SHA2003/LearningPublic.htm, accessed December 20, 2003.

Jeppson, Patrice L. and George Brauer
2003 Hey, Did You Hear about the Teacher Who Took the Class Out to Dig a Site? Some Common Misconceptions about Archaeology in Schools. In *Archaeologists and Local Communities: Partners in Exploring the Past*, edited by Linda Derry and Maureen Malloy, pp. 77-96. The Society for American Archaeology, Washington, D.C.

Johnson, Emily J.
2000 Cognitive and Moral Development of Children, Implications for Archaeology Education. In *The Archaeology Education Handbook, Sharing the Past with* Kids, edited by Karolyn Smardz and Shelley J. Smith, pp. 72-90. Altamira Press, Walnut Creek, California

Joukowsky, Martha Sharp
1990 Ethics in Archaeology: An American Perspective. *Berytus* 39:11-20.

Judd, Neil M.
1929. The Present Status of Archaeology in the United States. *American Anthropologist* 31(3):401-418.

Kehoe, Alice Beck
1998. The Land of Prehistory, A Critical History of American Archaeology. Routledge, New York.

Killan, Gerald
1998 Toward A Scientific Archaeology: Daniel Wilson, David Boyle and the Canadian Institute 1852-96. In Bringing Back the Past: Historical Perspectives on Canadian Archaeology, edited by Pamela Jane Smith and Donald Mitchell, pp. 15-24. Canadian Museum of Civilization, Mercury Series, Archaeological Survey of Canada. Hull, Quebec.

King, Thomas F.
1983 Professional Responsibility in Public Archaeology. *Annual Review of Anthropology* 12:143-164.

Lanouette, JoAnne
1985 High School Anthropology Texts: Sound the Alarm! *Anthropology & Education Quarterly* 16:331-336.

Ledbetter, R. Jerald
1999 Isabel Garrard Patterson: Advocate for Georgia Archaeology. In *Grit-Tempered: Early Women Archaeologists in the Southeastern United States*, edited by Nancy Marie White, Lynne P. Sullivan, and Rochelle A. Marrinan, pp. 42-56. University Press of Florida, Gainesville, Florida.

Lederman, Norman G., Judith S. Lederman, and Randy L. Bell
2004 Constructing Science in Elementary Classrooms. Pearson Education, Inc., Boston, MA.

Lerner, Shereen
1991 Saving Sites: Preservation and Education. In *Protecting the Past,* edited by George S. Smith and John E. Ehrenhard, pp. 103-108. CRC Press, Inc., Boca Raton, Florida.

Lipe, William
1974 A Conservation Model for American Archaeology. *The Kiva* 39:213-245.

Lodoen, Phyllis, Ben Hjermstad, and Ernest G. Walker
1994 *The Science of Archaeology, A Learning Guide*. University of Saskatchewan Press, Saskatoon, Saskatchewan.

Lyons, John F.
1997 The People's Curriculum: Henry Janzen and Curriculum Reform in Saskatchewan. Paper presented at the University of Saskatchewan, College of Education's History of Education Conference, September 26, 1997, Saskatoon, Saskatchewan. Electronic document, http://www.usask.ca:8900/edcur_801/htmlarticles/lyons.html, accessed November 7, 2002.

Mackie, Quentin
1995 Prehistory in a Multicultural State. In *Theory in Archaeology, A World Perspective* edited by Peter J. Ucko, pp. 178-196. Routledge, London, United Kingdom.

McCracken, G. D.
1988 *The Long Interview.* Sage Publications, Newbury Park, California.

McGimsey, Charles R. III
1972 *Public Archeology*. Seminar Press Inc., New York.

2003 The Four Fields of Archaeology. *American Antiquity* 68(4):611-619.

McGimsey, C. R. III and Davis, H. A.
1977 The Management of Archeological Resources: The Airlie House Report. Special Publication of the Society for American Archaeology.

McGuire, Randall H.
2003 Foreward. In *Ethical Issues in Archaeology*, edited by Larry J. Zimmerman, Karen D. Vitelli, and Julie Hollowell-Zimmer, pp. vii-ix. Altamira Press, Walnut Creek, California.

McManamon, Francis P.
1991 The Many Publics for Archaeology. *American Antiquity* 56(1):121-130.

2000 Foreword: Public Education, A Part of Archaeological Professionalism. In *The Archaeology Education Handbook, Sharing the Past with Kids,* edited by Karolyn Smardz and Shelley J. Smith, pp. 17-24. Altamira Press, Walnut Creek, California

McVittie, Janet
2001 Constructivist Learning Theory: Vygotsky / Piaget One-Page Handout. In *Teaching Science in Elementary Schools, Course Readings for EdCur 322.3, January to April 2003.* University of Saskatchewan Learning Resources, Saskatoon.

Merriman, Nick (editor)
2004 *Public Archaeology*. Routledge, London, United Kingdom.

Messenger, Phyllis Mauch (editor)
1999 *The Ethics of Collecting Cultural Property*. 2nd ed. University of New Mexico Press, Albuquerque.

Meyer, David
1985 Archaeology and the Nipawin Dam Project. In *A Teacher Handbook for Division III and IV, A Fine Science,* November, p.32. Saskatchewan Education.

Miles, M. B. and A. M. Huberman
1994 *Qualitative Data Analysis*. 2nd ed. Sage Publications, Inc., Newbury Park, CA.

Miller, G. A. and P. M. Gildea
1987 How Children Learn Words. *Scientific American* 257(3):94-99.

Mississippi Valley Archaeology Center
2000 Electronic document, http://www.uwlax.edu/mvac, accessed October 30, 2005.

Moloney, Norah
1997 Archaeology for the Young Reader. In *The Teaching of Anthropology: problems, issues, and decisions*, edited by C. P. Kottak, J. J. White, R. H. Furlow, and P. C. Rice, pp, 316-320. Mayfield Publishing Company, Mountain View, California.

Morgan, D. L.
1997 *Focus Groups as Qualitative Research.* 2nd ed. Sage Publications, Newbury Park, California.

Musser, Jill
1999 Archaeology, Education and First Nations: Two Case Studies from Central Saskatchewan. Published Master's thesis, Department of Anthropology and Archaeology, University of Saskatchewan, Saskatoon. Available at Special Collections, Main Library, University of Saskatchewan.

National Indian Brotherhood
1972 National Indian Brotherhood Policy Paper. National Indian Brotherhood, Ottawa.

National Park Service
2006a Archaeology for Kids. Electronic document, http://www.cr.nps.gov/archeology/public/kids/index.htm, accessed April 10, 2006.

2006b LearnNPS. Electronic document, http://www.nps.gov/learn/home.htm, accessed April 10, 2006.

2006c Management Policies 2006, Chapter 5, Cultural Resources Management. Electronic document, http://parkplanning.nps.gov/document.cfm?projectId=13746&documentID=12825), accessed April 10, 2006.

Neuman, Roberta G. and Wendy W. Thompson
1983 Sleuthing Through History: An Introduction to Archaeology. J. Weston Walsh, Portland, Maine.

Neumann, Thomas W. and Robert M. Sanford
2001 *Cultural Resources Archaeology, An Introduction*. Altamira Press, A Division of Rowman & Littlefield Publishers, Inc., Walnut Creek, California.

Newman, Garfield
2001 Echoes from the Past: World History to the 16th Century. McGraw-Hill Ryerson Limited, Whitby, Ontario.

Nicholas, George P.
1997 Education and Empowerment: Archaeology With, For, and By the Shuswap Nation, British Columbia. In *At A Crossroads: Archaeology and First Peoples in Canada*, edited by George P. Nicholas and Thomas D. Andrews, pp. 85-104. Publication No. 24, Archaeology Press, Simon Fraser University, Burnaby, British Columbia.

Nobles, Connie H.
1992 *Adventures in Classroom Archaeology.* Division of Archaeology, Baton Rouge, Louisiana.

Novak, Joseph D.
1993How Do We Learn Our Lesson? *The Science Teacher* March:50-55.

Office of Research Services
2003 Tri-council Policy Statement: Ethical Conduct for Research Involving Humans. Electronic document, http://www.usask.ca/research/ethics_review/guidelines.php, March 2003.

Onderdonk, Richard
1986 Piaget and Archaeology. *Archaeology* 36(6):80.

Osborn, Jill A.
1994 Engaging the Public. *CRM Bulletin* 17(6):15.

Osterweis Selig, Ruth
2000 Brokering Cultures: Archaeologists Reach Out to Teachers. In *The Archaeology Education Handbook, Sharing the Past with* Kids, edited by Karolyn Smardz and Shelley J. Smith, pp.151-164. Altamira Press, Walnut Creek, California.

Parks Canada
1993 *Discovering Our Past – Through History and Archaeology, Teacher's Guide.*

2006 Our Roots, Our Future. Electronic document, http://www.pc.gc.ca/apprendre-learn/prof/racines-roots/itm2-activ/activ_e.asp, accessed April 10, 2004.

Peturson, Rod and Bob Shields
1997 *Windows on the Past*. Harcourt Brace & Company Canada, Ltd.

Phillips, John L., Jr.
1981 *Piaget's Theory: A Primer*. W. H. Freeman and Company, San Francisco.

Poirier, David A. and Kenneth L. Feder
1995 Sharing the Past with the Present. *CRM* 18(3):3-4.

Pokotylo, David
2002 Public Opinion and Canadian Archaeological Heritage: A National Perspective. *Canadian Journal of Archaeology* 26:88-129.

Pokotylo, David and Andrew Mason
1991 Public Attitudes Towards Archaeological Resources and Their Management. In *Protecting the Past,* edited by George S. Smith and John E. Ehrenhard, pp. 9-18. CRC Press, Inc., Boca Raton, Florida.

Pokotylo, David and Neil Guppy
1999 Public Opinions and Archaeological Heritage: Views from Outside the Profession. *American Antiquity* 64(3):400-416.

Pretty, Kate
2000 Facts and Skills: Archaeology in Teacher Training. *Antiquity* 74:214-218.

Potter, Parker B., Jr.
1990 The "What" and "Why" of Public Relations for Archaeology: A Postscript to DeCicco's Public Relations Primer." *American Antiquity* 55(3):608-613.

Rice, Patricia C.
1998 *Doing Archaeology: A Hands-On Laboratory Manual.* Mayfield Publishing Company, Mountain View, California.

Roberts, Michael E.
1995 The Failed Promises of Public Archaeology. Paper presented at the 1995 Annual Meeting of the Society for American Archaeology, Minneapolis, Minnesota. Electronic document, http://www.timelinesinc.com/michael's_saa_paper.html, accessed July 11, 2003.

Robinson, Sam
2006 Curriculum Change in the 1980s: Directions and the Core Curriculum. In *A History of Education in Saskatchewan: Selected Readings*, edited by Brian Noonan, Dianne Hallman and Murray Scharf, pp. 209-219. Canadian Plains Research Center, University of Regina.

Rollans, Maureen
1990*Handbook for Teaching Archaeology in Saskatchewan Schools*. Revised edition. Western Heritage Services, Saskatoon, Saskatchewan.

Royal Alberta Museum
2006 Stories of the Earth. Electronic file, http://www.royalalbertamuseum.ca/edu/programs/grade.asp?grade=six, accessed April 10, 2006.

Royal Saskatchewan Museum
2006 First Nations Gallery. Electronic file, http://www.royalsaskmuseum.ca/gallery/first_nations/first_nations.shtml, accessed April 10, 2006.

Rudestam, K.E. and R. R. Newton
2001 *Surviving Your Dissertation: A complete guide to content and process.* 2nd edition. Sage Publications Inc., Thousand Oaks, CA.

Saskatchewan Archaeological Society Newsletter
2005 *The Saskatchewan Archaeological Society.* 26(4):129. Saskatchewan Archaeological Society, Saskatoon, Saskatchewan.

Saskatchewan Association of Professional Archaeologists
2006 *Mission Statement*. Electronic document, http://www.sasknow.com/~sapa/, accessed April 13, 2005.

Saskatchewan Education
n.d *Core Curriculum: An Information Bulletin for Administrators*. Electronic document, http://www.sasked.gov.sk.ca/docs/policy/core/intro.html, accessed July 3, 2006.

Saskatchewan Education
1990 *Science: A Curriculum Guide for the Elementary Level*. Electronic document, http://www.sasked.gov.sk.ca/docs/elemsci/gr5tcesc.html, accessed February 2, 2004.

Saskatchewan Education, Training and Employment
1995 Indian and Metis Education Policy From Kindergarten to Grade 12. Electronic document, http://www.sasked.gov.sk.ca/branches/fn-me/docs/k12policy.pdf, accessed February 4, 2004.

Saskatchewan Learning
1995 *Saskatchewan Evergreen Curriculum.* A Curriculum Guide for the Middle Level, Grade 9 Social Studies Curriculum, Regina, Saskatchewan.

Schoolnet Digital Collections Program
2006 Archaeology: A Step Back In Time, The Grassy Island Experience. Electronic document, http://collections.ic.gc.ca/archaeology/, accessed April 10, 2006.

Schwab, Joseph J.
1969 The Practical: A Language for Curriculum. *The School Review* 78(1):1-23.

Shackel, Paul A. and Erve J. Chambers (editors)
2004 Places in Mind: Public Archaeology as Applied Anthropology. Routledge, New York.

Shanks, Michael and Randall H. McGuire
1996 The Craft of Archaeology. *American Antiquity* 61(1):75-89.

Sharer, Robert J. and Wendy Ashmore
2003 *Archaeology: Discovering Our Past.* 3rd ed. McGraw-Hill, New York.

Short, K. G. and Burke C.
1991 *Creating curriculum: Teachers and students as a community of learners.* Heinemann, Portsmouth, NH.

Shulha, Lyn M. and Robert J. Wilson
2003 Collaborative Mixed Methods Research. In *Handbook of Mixed Methods in Social and Behavioral Research,* edited by Abbas Tashakkori and Charles Teddue, pp. 639-669. Sage Publications, Inc., Thousand Oaks, CA.

Smardz, Karolyn (editor)
2000 Digging With Students: Teaching Students to Touch the Past. In *The Archaeology Education Handbook, Sharing the Past with Kids*, pp. 234-248. Altamira Press, Walnut Creek, California.

Smardz, Karolyn and Shelley J. Smith (editors)
2000 The Archaeology Education Handbook, Sharing the Past with Kids. Altamira Press, Walnut Creek, California.

Smardz Frost, Karolyn E.
2004 Archaeology and Public Education in N. America. In *Public Archaeology*, edited by Nick Merriman, pp. 59-84, Routledge, London.

Smith, Doug and Sam Robinson
2000 *An Action Research Report: Connecting Wanuskewin and Schools*. McDowell Foundation for Research into Teaching, Saskatoon, Saskatchewan.

Smith, George S. and Susan J. Bender
2000 The Society for American Archaeology's 'Teaching archaeology in the 21st century initiative. *Antiquity* 74:186-189.

Smith, George S. and John E. Ehrenhard (editors)
1991
Introduction. In *Protecting the Past.* CRC Press, Inc., Boca Raton, Florida.

Smith, Pamela Jane and Donald Mitchell (editors)
1998 *Bringing Back the Past, Historical Perspectives on Canadian Archaeology.* Mercury Series, Archaeological Survey of Canada, Paper 158, Canadian Museum of Civilization, Hull, Quebec.

Society for American Archaeology
1990 Archaeology and Public Education. Electronic document, http://www.saa.org/PubEdu/A&PE/back.html, accessed May 13, 2003.

1995 Teaching Archaeology, A Sampler for Grades 3 to 12, edited by Joan Few and KC Smith. Electronic document, http://www.saa.org/PubEdu/A&PE/back.html, accessed May 13, 2003.

2000 Exploring Public Perceptions and Attitudes About Archaeology. Electronic document, http://www.saa.org/pubedu.nrptdraft4.pdf, accessed October 24, 2003.

2005 Archaeology for the Public. Electronic document, http://www.saa.org/public/home/home.html, accessed January 2008.

2005 Making Archaeology Teaching Relevant in the XXI Century (M.A.T.R.I.X.). Electronic document, http://saa.org/public/resources/bibliography_coursematerial.html, accessed January 2008.

Society for Historical Archaeology
2005 Unlocking the Past: Celebrating Historical Archaeology of North America. Electronic document, http://www.cr.nps.gov/seac/unlocking/unlocking.htm, accessed April 10, 2006.

Statistics Canada
2006 2001 Census Aboriginal Population Profiles. Electronic document, http://www12.statcan.ca/english/profil01/AP01/Search/SearchForm_Results.cfm?Lang=E, accessed July 25, 2005.

Stone, Peter and Robert MacKenzie (editors)
1990 *Excluded Past: Archaeology in Education.* Unwin Hyman Ltd., London, United Kingdom.

Strauss, A. and J. Corbin
1998 *Basics of Qualitative Research Techniques and Procedures for Developing Grounded Theory*. 2nd ed. Sage Publications, Newbury Park, California.

Sullivan, Lynne P.
1999 Madeline D. Kneberg Lewis: Leading Lady of Tennessee Archaeology. In *Grit-Tempered: Early Women Archaeologists in the Southeastern United States*, edited by Nancy Marie White, Lynne P. Sullivan, and Rochelle A. Marrinan, pp. 57-91. University Press of Florida, Gainesville, Florida.

Taylor-Hollings, Jill
1998a Results of the 1997 Crystal Beach Road Site Education and Public Archaeology Project. In *Proceedings and Abstracts of the 8th Annual APALA Student Conference,* edited by Laurie L. Carson, Nathan Friesen, and Sandra Pentney, pp. 216-223. University of Saskatchewan, Saskatoon, Saskatchewan.

1998b Second Public Archaeology Project at the Crystal Beach Road Site (EkNv-75): An Avonlea/Besant Campsite in Southwestern Saskatchewan. Manuscript on file, Department of Archaeology, University of Saskatchewan, Saskatoon, Saskatchewan.

The StarPhoenix
2005 Education System Failing Students When It Comes to History. 11 November: B8. Saskatoon, Saskatchewan.

The Dominion Institute
2005 March 21, International Day for the Elimination of Racial Discrimination, One in Six Canadians Say They Have Been the Victim of Racism. Electronic document, http://www.dominion.ca/Downloads/IRracismSurvey.pdf, accessed November 26, 2005.

Tippett, Lee
1996 A Brighter Future for Public Archaeology. Electronic document, http://wwlists.gardencity.net/archives/acra-1/1996-April/000560.html, accessed February 10, 2005.

Toffler, Alvin
1980 *The Third Wave.* Electronic document, *Wikipedia, The Free Encyclopedia*. http://en.wikipedia.org/w/index.php?title=The_Third_Wave_%28book%29&oldid=61433735, accessed February 2006.

Tyler, Ralph
1981 Specific Approaches to Curriculum Development. In *Curriculum and Instruction: Alternatives in Education,* edited by Henry A. Giroux, Anthony N. Penna, and William F. Pinar, pp. 18-19. McCutchan Publishing Corporation, Berkeley, CA.

Ucko, Peter J. (editor)
1995 Theory in Archaeology, A World Perspective. Routledge, London, United Kingdom.

Vygotsky, Lev S.
1962 *Thought and Language*. (Haufmann, E., and G. Vakar, trans.) MIT Press, Cambridge, Massachusetts. (Original work published in 1934.)

Walker, Ernest
1986 The Dig at Tipperary Creek. In *A Teacher Handbook for Division III and IV, A Fine Science 2,* November, pp. 32-34. Saskatchewan Education.

Walliman, Nicholas
2005 *Your Research Project*. 2nd ed. Sage Publications Ltd., London, U.K.

White, Jane J. (editor)
1997 Teaching Anthropology to Precollegiate Teachers and Students: Problems, Issues, and Solutions in the Teaching of Anthropology K-12. In *The Teaching of Anthropology, Problems, Issues, and Decisions,* pp. 289-298. Mayfield Publishing Company, Mountain View, California.

White, Nancy Marie (editor)
1999 Yulee W. Lazarus: From Avocational to Professional in Northwest Florida. In *Grit-Tempered: Early Women Archaeologists in the Southeastern United States*, pp. 163-177. University Press of Florida, Gainesville, Florida.

1999 Hester A. Davis: A Legend in Public Archaeology. In *Grit-Tempered: Early Women Archaeologists in the Southeastern United States*, pp. 206-229. University Press of Florida, Gainesville, Florida.

1999 Martha Ann Rolingson: From Paleo Points to Platform Mounds. In *Grit-Tempered: Early Women Archaeologists in the Southeastern United States*, pp. 230-255. University Press of Florida, Gainesville, Florida.

Williams, Martha
2000 Retrospective: Personal Thoughts on the Maturation of Archaeological Education. In *The Archaeology Education Handbook, Sharing the Past with Kids*, edited by Karolyn Smardz and Shelley J. Smith, pp. 394-398. Altamira Press, Walnut Creek, California.

Willis, Jerry
2000 The Maturing of Constructivism Instructional Design: Some Basic Principles That Can Guide Practice. *Educational Technology* XL(1):5-16.

Wolf, Dennie P., Dana Balick, and Julie Craven (editors)
1997 *Digging Deep: Teaching Social Studies Through the Study of Archaeology*. Heinemann, a division of Reed Elsevier Inc., Portsmouth, New Hampshire.

Wright, John
2000 Canadians' Views on History Education, Three Quarters (76%) Embarrassed by Lack of Knoweldge Canadians Have About their History. Electronic document, http://www.ipsos-na.com/news/pressrelease.cfm?id=1298, accessed February 10, 2005).

Young, Peter A.
2003 The Archaeologist As Storyteller. *The SAA Archaeological Record* 3(1)7-10.

Zimmerman, Larry J., Karen D. Vitelli and Julie Hollowell-Zimmer (editors)
2003 *Ethical Issues in Archaeology*. Altamira Press, Walnut Creek, California.

APPENDIX A

Consent Form for Teachers

You are invited to participate in a study entitled *Development of Curriculum-Relevant Archaeology Materials.* Please read this Form carefully, and feel free to ask questions you might have.

Researcher: Marie Karner, Graduate Student, Department of Archaeology, University of Saskatchewan
Telephone: (306) --- or (306) ---; email: ---

Supervisors: Dr E. G. Walker, Department of Archaeology, University of Saskatchewan
Telephone: --- (office); email: ---

Dr. J. McVittie, College of Education, Curriculum Studies, University of Saskatchewan
Telephone: --- (office); email: ---

Purpose:

The purpose of this thesis research is to develop and test curriculum-relevant archaeology materials. Teaching materials will include an emphasis on Northern Plains cultural groups, in pre- and post-contact contexts.

Possible benefits of the study:

The field of archaeology incorporates a multi-subject approach, and is therefore an excellent subject through which educators may reinforce many of Saskatchewan Learning's Evergreen Curriculum's Required Areas of Study, Common Essential Learnings, and meet the goals of Aboriginal and Métis content, multicultural education, and gender equity in the classroom. Archaeology teaching materials developed for this study will also serve to relieve educators and students who may be "burdened with archaeological 'misprints'" of the past (Pretty 2000:215).

Archaeology is a powerful tool that can be used to awaken students' curiosity, and to teach them about the world in which they live. Including archaeological content in a social studies or science curriculum, without having a curriculum-relevant, pre-tested unit plan to base archaeology curricula on could prove very difficult, due to the logistical demands of such an endeavour, among other things. It is anticipated that this study will provide the researcher with data for developing, testing, publishing, and making available to teachers, curriculum-relevant, ready-to-use archaeology materials. Teachers of elementary and high-school students will be able to easily access these archaeology materials to use in their classrooms to teach subjects in both the natural and social sciences.

With the exception of a few lesson plans and unit plans that patrons can borrow from the Stewart Resource Centre (part of the Saskatchewan Teachers' Federation), there is a general lack of Saskatchewan and/or Northern Plains-based, curriculum-relevant, accessible, ready-to-use archaeology education material. The materials that develop out of this thesis research may help to fill this void. Also, the Canadian Archaeology Association Public Outreach and Education Committee is currently in the process of developing both a national listing and a Western Canada Resource Document listing public archaeology programs and materials available throughout Canada. The thesis and teaching materials resulting from this study could be made available to this Committee for these purposes.

This thesis research has the potential for positive, short- and long-term contribution to public archaeology as well as curriculum development and education, and it has the potential to enhance the teaching of Saskatchewan's core curriculum subjects (which benefits educators and students), increase the visibility of archaeology among the general public, and go far to dispel some of the myths and misconceptions held by the general public about archaeology and the people and cultures archaeologists study.

The above are the possible, but not guaranteed, benefits of the study.

Procedures to be followed:

Your participation in this study will provide information for the development of archaeology teaching materials. You will be asked to commit to attending two or three, one-hour planning meetings before the teaching of archaeology materials occurs in the classroom. During these planning meetings, teachers will share and provide information to the researcher through audio- and video-taped interviews. You have the option to turn off or ask the researcher to turn off the audio- or video-recorder at any time during the course of any interview. You have the option at this point to either continue or discontinue the interview. Also, please see the section "Confidentiality/Anonymity" below.

During the period when the archaeology materials are being taught and tested, teachers should also (at their discretion) consider that they might want to spend up to 15 minutes a day with the researcher to discuss daily progress and supports they may require to enhance the previously-taught lesson plan, or to supplement upcoming lesson plans in this unit. After the teachers have completed teaching the archaeology content, they should also expect to commit up to three hours to participate in interviews regarding the efficacy of the teaching materials that were designed for their use, and to share their opinions on the applicability of archaeology education, students' perceptions of the unit and any other matters that arise. Therefore, in addition to regular classroom time that teachers normally commit, and in addition to the time teachers may spend sharing their observations and comments on the day's lesson plan (which is at teachers' discretion), teachers should expect to commit to up to six additional hours in order to accomplish the process described in this section.

The researcher will record in writing field notes of observations and behaviours demonstrated by teachers and students during the course of the archaeology education, and will photograph and audio -/video-record during classroom and excavation times. All tapes, audio and video, will be transcribed by the researcher. Teachers will have their transcripts returned to them for review as soon as possible after an interview. At that time, teachers may delete or change any comments they made, to ensure that what they meant to say is recorded, and also to ensure that nothing that could damage the teacher's career will be published.

Potential risks of the study:

A possible risk is that the school division will know which teachers participated in the study. Thus, the teachers will have final say in the inclusion of any of their data that are to be included in the master's thesis. There are no other known or anticipated risks associated with the research.

Storage of data:

All information that is collected during of the course of this research that in any way could serve to identify teacher-participants will be securely stored by Dr. E. G. Walker at the Department of Archaeology, University of Saskatchewan, for a period of five (5) years following completion of this research.

Dissemination of results:

Data collected in this study is intended to be used in a master of arts thesis. Aggregate data will be presented at conferences and seminars, and results from this research could be published in professional and academic journals. Teachers participating in this study will receive from the researcher notice of any presentations in which data relating to this study was/will be presented. Teachers will also receive a concise summary of the findings of the research when the thesis is completed and successfully defended. An unbound copy of the researcher's defended master's thesis will be provided to the Saskatoon Catholic Schools Main Office. Finally, copies of the approved thesis will be made available as per instructions of the Graduate Studies and Research Office, University of Saskatchewan.

Right to withdraw:

You may withdraw from the study for any reason, at any time, without penalty of any sort by contacting the researcher at ---, ---, or by email at ---. If you withdraw from the study at any time, any data that you have contributed will be destroyed at the earliest opportunity.

Confidentiality/Anonymity:

The data from this study will be published in a thesis and presented at conferences, workshops and seminars. In all materials resulting from this study, your identity will remain confidential. You will be given a pseudonym. Also, all identifying information including names, names of schools and teachers participating in the study, and any other information that could lead someone to identifying participants in this study, will be removed from all material that results from this study, and will be stored by Dr. E. G. Walker of the Archaeology Department, University of Saskatchewan for a period of five (5) years.

Use of data

The data collected in this study will be included in a master's thesis. Data collected during this research will be reported as aggregate results only. Direct quotations and comments will be used in the reporting and presentation of research data when appropriate. All direct quotes and comments that are included in materials resulting from this research will be acknowledged using a pseudonym.

Ethics review and approval:

This study has been approved on ethical grounds by the University of Saskatchewan Behavioural Sciences Research Ethics Board on May 7, 2004.

Questions:

If you have any questions concerning the study, please feel free to ask at any point; you are also free to contact the researcher and supervisors at the numbers provided above if you have questions at a later time. Any questions regarding your rights as a participant may be addressed to that committee through the Office of Research Services, 966-2084. Out of town participants may call collect. Results of the study will be published in a thesis prepared by the researcher involved in this study.

Consent to participate:

I have read and understood the description provided above. I have had an opportunity to ask questions and my questions have been answered satisfactorily. I consent to participate in the study described above, understanding that I may withdraw this consent at any time. A copy of this Consent Form has been given to me for my records.

Signature of Participant	Date
Signature of Researcher	Date

APPENDIX B

Consent Form for Parent or Guardian of Students

Your child or a child under your guardianship is invited to participate in a study entitled *Development of Curriculum-Relevant Archaeology Materials.* Please read this Form carefully, and feel free to ask questions you might have.

Researcher: Marie Karner, Graduate Student, Department of Archaeology, University of Saskatchewan
Telephone: (306) --- or (306) ---; email: ---

Supervisors: Dr E. G. Walker, Department of Archaeology, University of Saskatchewan
Telephone: --- (office); email: ---

Dr. J. McVittie, College of Education, Curriculum Studies, University of Saskatchewan
Telephone: --- (office); email: ---

Purpose:

The purpose of this thesis research is to develop and test curriculum-relevant archaeology materials. Teaching materials will include an emphasis on Northern Plains cultural groups, in pre- and post-contact contexts.

Possible benefits of the study:

The field of archaeology incorporates a multi-subject approach, and is therefore an excellent subject through which educators may reinforce many of Saskatchewan Learning's Evergreen Curriculum's Required Areas of Study, Common Essential Learnings, and meet the goals of Aboriginal and Métis content, multicultural education, and gender equity in the classroom. Archaeology teaching materials developed for this study will also serve to relieve educators and students who may be "burdened with archaeological 'misprints'" of the past (Pretty 2000:215).

Archaeology is a powerful tool that can be used to awaken students' curiosity, and to teach them about the world in which they live. Including archaeological content in social studies or science curricula, without having a curriculum-relevant, pre-tested unit plan to base archaeological resources on, could prove very difficult, due to the logistical demands of such an endeavour, among other things. It is anticipated that this study will provide the researcher with data for developing, testing, publishing, and making available to teachers, curriculum-relevant, ready-to-use archaeology materials. Teachers of elementary and high-school students will be able to easily access these archaeology materials to use in their classrooms to teach subjects in both the natural and social sciences.

With the exception of a few lesson plans and unit plans that patrons can borrow from the Stewart Resource Centre (part of the Saskatchewan Teachers' Federation), there is a general lack of Saskatchewan and/or Northern Plains-based, curriculum-relevant, accessible, ready-to-use archaeology education material. The materials that develop out of this thesis research may help to fill this void. Also, the Canadian Archaeology Association Public Outreach and Education Committee is currently in the process of developing both a national listing and a Western Canada Resource Document listing public archaeology programs and

materials available throughout Canada. The thesis and teaching materials resulting from this study could be made available to this Committee for these purposes.

This thesis research has the potential for positive, short- and long-term contribution to public archaeology as well as curriculum development and education, and it has the potential to enhance the teaching of Saskatchewan's core curriculum subjects (which benefits educators and students), increase the visibility of archaeology among the general public, and go far to dispel some of the myths and misconceptions held by the general public about archaeology and the people and cultures archaeologists study.

The above are the possible, but not guaranteed, benefits of the study.

Procedures to be followed:

The purpose of this thesis research is to develop and test curriculum-relevant archaeology materials. Teaching materials will include an emphasis on Northern Plains cultural groups, in pre- and post-contact contexts. These materials will be made available to elementary and high school teachers.

Any and all students who have received consent from their parents or guardians and who have given assent to participate in this research will be required to make no additional time commitments or other commitments, other than what is expected of them by their teachers during the normal course of a classroom period. Participation or non-participation in this research will not affect your child's grade in the course. The teachers will not know which students have agreed to participate in this study, and which have not, as the signed Consent Form and signed Assent Form will be returned directly to the researcher, and not your child's teacher.

Data collected from this research will be reported as aggregate results only. Direct quotations and comments will be used in the reporting and presentation of research data when appropriate. All direct quotes and comments that are included in materials resulting from this research will be acknowledged using a pseudonym.

Potential risks of the study:

There are no known or anticipated risks associated with this study.

Confidentiality/Anonymity:

The data from this study will be published in a thesis and presented at conferences, workshops and seminars. In all materials resulting from this study, the identities of all participants will remain confidential. They will each be given a pseudonym. Also, all identifying information including names, names of schools and teachers participating in the study, and any other information that could lead someone to identifying participants in this study, will be removed from all material that result from this study, and will be stored by Dr. E. G. Walker of the Archaeology Department, University of Saskatchewan for a period of five (5) years, after which time they will be destroyed.

Right to withdraw:

You may withdraw your son /daughter from the study for any reason, at any time, without penalty of any sort. If you withdraw them from the study at any time, any data that they have contributed will be destroyed.

Questions:

If you have any questions concerning the study, please feel free to ask at any point; you are also free to contact the researcher at the numbers provided above if you have questions at a later time. Any questions regarding you, or your son's or daughter's participation may be addressed to that committee through the Office of Research Services, 966-2084. Out of town participants may call collect. Results of the study will be published in a thesis prepared by the researcher involved in this study.

Ethics review and approval:

This study has been approved on ethical grounds by the University of Saskatchewan Behavioural Sciences Research Ethics Board on May 7, 2004.

Consent to participate:

I have read and understood the description provided above. I have had an opportunity to ask questions and my questions have been answered satisfactorily. I consent to my son's/daughter's participation in the study described above, understanding that I may withdraw this consent at any time. A copy of this Consent Form has been given to me for my records.

Signature of Parent/Guardian	Date
Signature of Researcher	Date

APPENDIX C
Assent Form for Students

You are invited to participate in a study entitled *Development of Curriculum-Relevant Archaeology Materials.* Please read this Form carefully, and feel free to ask questions you might have.

Researcher: Marie Karner, Graduate Student, Department of Archaeology, University of Saskatchewan
Telephone: (306) --- or (306) ---; email: ---

Supervisors: Dr E. G. Walker, Department of Archaeology, University of Saskatchewan
Telephone: --- (office); email: ---

Dr. J. McVittie, College of Education, Curriculum Studies, University of Saskatchewan
Telephone: --- (office); email: ---

Participation in this study:

Your participation in this study is an optional activity. If your parent, guardian or you choose not to participate in this study, this will not affect your grade in this class in any way, and your teacher will not be told by the researcher of your non-participation in the research. The classroom activities included in the archaeology education are part of the regular school program. Whether or not you agree to participate in the research does not change that you are obliged, as part of this course, to attend classes.

Description of participant involvement:

Your involvement in this study will occur during school hours, and is expected to take place between May 2004 to June 2004. The researcher in this study also plans to observe students, as well as photograph (camera) and audio- and video-record students during the course of this study, both inside the classroom and during any outdoor activities are a part of the teaching materials tested in this study, including excavations and field trips.

Right to withdraw:

You may withdraw from the study for any reason, at any time, without penalty of any sort. If you withdraw from the study, any data that you have contributed will be destroyed as soon as possible.

Possible risks of the study:

There are no known or anticipated risks associated with this study.

Confidentiality/Anonymity:

Your contribution(s) to this study will be kept private, and will not be shared with any other person. The teachers will not know if you have agreed to participate in this study, as the signed Consent Form and signed Assent Form will be returned directly to the researcher, and not your teacher.

The researcher will undertake to safeguard the confidentiality of any discussions that occur in the classroom, but cannot guarantee that other members of the group will do so.

Please respect the confidentiality of other members of the group by not sharing the contents of any classroom discussions outside the classroom group. Be aware, however, that other students may not respect your confidentiality.

The data from this study will be published in a thesis and presented at conferences and seminars. In all materials resulting from this study, your identity will remain confidential; you will be given a pseudonym (a fake name). Also, all identifying information including teachers' names, names of schools participating in the study, and any other information that could lead someone to identifying participants in this study, will be removed from all materials that result from this study.

Ethics review and approval:

This study has been approved on ethical grounds by the University of Saskatchewan Behavioural Sciences Research Ethics Board on May 7, 2004.

Questions:

If you have any questions concerning the study, please feel free to ask at any time; you are also free to contact the researcher or supervisors at the numbers provided above if you have questions at a later time. Any questions regarding your rights as a participant may be addressed to that committee through the Office of Research Services, 966-2084. Out of town participants may call collect.

Consent to participate:

I have read and understood the description provided above. I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I consent to participate in the study described above, understanding that I may withdraw this consent at any time. A copy of this Consent Form has been given to me for my records.

Signature of Student	Date
Signature of Researcher	Date

APPENDIX D

- INTERVIEW GUIDE-

- **All interviews will be tape-recorded**
- **Recorded cassettes and transcripts of interviews will be stored at a secure location by the researcher.**
- **The questions below may be asked in any order, and may be modified according to how the conversations unfolds.**

INTERVIEW 1: Interview(s) held with teachers at development stage of the archaeology unit:

Questions:
- What prevented you from incorporating archaeology examples and concepts into your lesson plans?
- What do you think you would need to integrate archaeology content into the units we have identified as having links with archaeology?

INTERVIEW 2: Interview(s) held with teachers after archaeology unit materials have been developed, according to needs identified by teachers during initial interviews. Teachers will have already received the first draft of the Unit Plan and accompanying materials, and will have had time to review same and make any changes to the materials. The materials teachers are considering for this second interview will include such changes. The researcher will make themselves available to the teacher for a brief period of time before the class (in which archaeology is being taught) begins.

Questions:
- Are there any questions or comments you have before you begin teaching this material?
- Would you like me to join you in your classroom, or meet you somewhere after class?

If a teacher wants the researcher to meet with them after class, the researcher will wait well back of the classroom door and exiting students, then enter the classroom when all the students have exited. The researcher will ask the teacher:

Questions:
- Do you have any comments or questions regarding the materials and their content?
- How do you feel it went?
- Are there any additional resources that may be of assistance to you?
- Do you have any questions regarding the next lesson?

(continued next page)

APPENDIX D
Interview Guide (cont.)

INTERVIEW 3: Interviews with teachers after the archaeology lessons/units have been taught/tested

Questions:

- Do you have any comments regarding the materials, your experiences, or any student feedback?
- Would you consider bringing archaeology into your classrooms again? If yes, How do you see this occurring? (every term?/every year?) If no, Do you have any reason for this decision? If yes, If an archaeologist or a senior archaeology student were available to you as a resource person while you are teaching using archaeology, would you take advantage of their expertise? If yes, What type of support, if any, would you require of an archaeologist in this endeavour?
- Do you believe students benefited academically through their involvement in archaeology education? this approach to teaching?" If yes, "How do you think they benefited? If no, Why do you think this is the case? If yes or no, How can the archaeology resources developed in this research be improved for your use, and your students' application?
- What are your overall impressions of teaching with archaeology?"

APPENDIX E

SUBURBAN HIGH SCHOOL
- TEACHER QUESTIONNAIRE -

(Administered November – January 2005)

1. Please describe any classroom assignments (reports, journal writing, etc.) or special readings you assigned to students during their participation in the archaeology education.

2. Some of you have special needs students (ESL, disabled, etc) in your class. I have received feedback from TA's describing their opinions on their students' involvement in the archaeology education. How would you assess their ability to participate in the archaeology unit?

3. Do you think the archaeology unit is appealing to students who generally are not engaged in academics?

4. How would you feel about other schools using your school's site as a teaching site, to support the delivery of their own archaeology unit?

5. If a real archaeological site were available for your students to dig at (partnership with WHP or at another site), either in the school year, or during the summer, do you think you would utilize it?

6. In this archaeology unit, I have noticed, as have other teachers at this high school have mentioned to me, that there is crossover into other subjects including science, math, art, and language arts, to name a few subjects. You will recall that the first couple of archaeology units (Sept 03 and June 04) involved students asking research questions and practising science through following the scientific method. This we call integrated curricula. What are your thoughts about this?

7. What are your plans for the future as it regards archaeology education and grade 9 social studies students? Any thoughts about bringing in higher grades?

8. Any other comments or insight you wish to share are welcome. Please do so now!

That ends this interview. Thank you for your time.

Appendix E continued

APPENDIX E (cont.)

SUBURBAN HIGH SCHOOL
TEACHER QUESTIONNAIRES

(Administered June 2005)

Dear Teachers:

I would be extremely grateful to each of you if you would take a few minutes to answer the following five questions (the sixth question is optional!). I plan to use the information you share in my thesis. You can write your responses on this sheet (other side), and/or attach additional sheet(s) as you wish. Handwritten or typed responses are fine with me. I would like to receive your comments by Friday, June 24.

1. Please provide a list of materials you have created or used between 2003 and 2005 (in the classroom and during excavation), such as assignments, quizzes and final exams. Photocopies of these would be most appreciated. Materials such as projectile point displays, activity books or magazine articles (used as is or adapted) should be included in this list. Please provide sources (titles/author/publisher – if you have) for books, magazine articles, etc. You do not have to include in your list materials developed as part of the archaeology unit or used during this period (lesson plans, videos, etc.), materials used during labwork and display set-up, or items that are included in the blue excavation kits or as part of the excavation itself (screens, etc).

2. Please describe any classroom assignments (reports, journal writing, etc.) you assigned to students during their participation in the archaeology education.

3. Please provide a description/assessment of your participation in the archaeology education. You could describe relativity of the archaeology education to the curriculum, or outcomes, such as what you or your students have experienced/ learned through participation in the archaeology education. Any comments you have to share will be welcome.

4. How many of your grade 9 social studies students have participated in the archaeology education: in 2003, in 2004, in 2005.

5. What are your plans for fall 2005 and spring/summer 2006 as it regards archaeology education and grade 9 history students?

6. Please share any other comments or insight you wish to share are welcome. Please do so now!

Thank you for completing this questionnaire

APPENDIX F

ARCHAEOLOGY UNIT: INNER-CITY ELEMENTARY SCHOOL

LESSON PLAN 1: ECOSYSTEMS, From Aboriginal Perspectives

Time: 45 minutes in-class

Materials: - Principle III (printed material from binder and VHS tape – 9 mins. Length *All Life Forms Are Interrelated*
- Overhead - Ecosystems

Evaluation: written assignment

Activity:

- Write the words "Ecosystem" and "biodiversity" on the blackboard before class begins.
- Begin Lesson Plan 1 with a brief description of what an archaeologist does. Students will be advised that they will be learning about and through archaeology over the next two weeks, and that they'll be learning what an ecosystem is, about the climate and climate change on the Northern Plains over the past several thousand years and how that affected the way people lived, they'll be learning about chemicals and their reactions, as well as volcanoes.
- Begin with Ecosystems.
- Ask students what they think Ecosystem and Biodiversity means. Let them respond.
- Next, put up and refer to the Ecosystems overhead. Ask students to take out their notebooks, write down the date, the title Ecosystems, and make some notes from the overhead.
- Take five minutes or so to explain the concepts on the overhead; ask students to write down these concepts. Mention Wanuskewin, and the many different ecosystems that exist there: the Opimihaw Creek, the river valley, the Saskatchewan River, the prairie areas, and how they are teaming with living organisms, that function in smaller ecosystems that operate within larger ecosystems, and then the prairie ecosystem. Tell students we'll be visiting Wanuskewin later in this school year.
- Using the notes from Principle III, continue with a description of how Native ways are rooted in the philosophy that all living things are interconnected, and that there are no isolated ecosystems.
- Also tell them that Aboriginal peoples believe that any changes that occur among any living things, whether naturally occurring (river flooding, forest fires) or caused by human beings, affect the entire circle of life in some way.

Lesson Plan 1 (continued on next page)

- Aboriginal peoples try to live in harmony with the land. They collect only as much as they need, and try to make use of every part of that resource (ie, every part of the bison).
- Ask students to pay attention to the film's reference to how Aboriginal peoples understand the cyclical patterns of plants and animals, and learned, therefore, how to take advantage of resources in such a way as to collect them when they are most abundant, in order to maintain balance and harmony among all living things, and also to maintain the carrying capacity of Mother Earth.
- Then, show them the Principle III film, "All Life Forms Are Interrelated" (9 mins. Length). Show it twice. Students will be asked to watch it only the first time, and then to watch it again, and this time also take notes, jotting down key words and ideas.

This should take us to the end of the class and Lesson Plan 1.
Tell students to think about what they have learned from today's film and class, including that Aboriginal peoples believe that all life forms are interrelated, that any change to one living thing affects all other living things, and that humans have been in the past, are today, and will be in the future, the stewards of Mother Earth.

Lesson Plan 1: Ecosystems, From Aboriginal Peoples' Perspectives
Overhead

ECOSYSTEMS:

An ecosystem:

- is a biological community of interacting organisms and their physical environment.

- can be very small, such as a pond, or very large, the entire world.

- is a whole pond, or the whole field, with everything in the pond or the field.

With ecosystems, there is always an exchange of energy, with material and energy flowing in and out of ecosystems.

We can look at the prairies as an ecosystem that is made up of animals, humans, plants, soils, and events including fires, grazing, climatic events, and anything else that may happen on or to the land and what's living on or in it.

The interaction between and among all things within an ecosystem affects that ecosystem, and all ecosystems.

In order for any animal or living thing to survive within an ecosystem, it must be behaviourally and physically adapted to the conditions of that particular environment (within the ecosystem).

The Study of Ecosystems continues in Lesson Plans 2 and 3

LESSON PLAN 2: ECOSYSTEMS, From Aboriginal Peoples' Perspectives

Time: 45 minutes in-class

Materials: - *Practising the Law of Circular Interaction: First Nations Environment and Conservation Principles* (white binder); Introduction section at front of binder. (Each of the Six
- Principles includes descriptive notes that can be referred to to describe the Principles in greater detail).
- The Six Fundamental Principles overhead
- The Six Fundamental Principles handout – for students' use..

Evaluation: presentation; written/drawing assignment; student portfolio

Activity:

- Ask students to think about the film they saw yesterday – *All Life Forms Are Interrelated,* and to recollect some of the key words (circle, Mother Earth, carrying capacity, etc.) that they heard and learned about.
- Next, divide the class into six groups.
- Put up the overhead, *The Six Fundamental Principles* and assign one of the Six Principles to each of the groups.
- Instruct students to take the next 10 minutes to discuss what their Principle means to them, to write, draw, or in whatever way they wish to, depict what that Principle means to members of their group.
- Instruct students that they should also choose someone to be their "spokesperson"; this "spokesperson" will stand up either with their group, or come with their group to the front of the class, and explain to the rest of the students what their Principle means to them.
- Tell groups that they will be teaching all the other students about the Principle they're working with, so they should be thorough and do a good job of discussing and expressing their Principle.
- Tell the students who are listening and watching that they should be writing down key words/concepts that are presented by each of the groups' spokespeople. Each student should end up with notes for each of the Six Principles, including their own Principle.
- Each group's spokesperson will be given 2 minutes to present their ideas.
- The teacher will ask the spokesperson from group 1 through to 6 to stand up, state their Principle, then share any ideas or concepts the group has come up that reflects their views on that particular Principle. By the end of this, each of the six Principles will be written on the blackboard, with at least a couple of points per Principle.
- Also, Teachers should note any ideas that promote stereotypes and/or misconceptions that are held by any of the students, for discussion today or later in the Unit).

Lesson Plan 2 (continued on next page)

- Once all of the spokespersons have presented their group's ideas, and students have had a chance to write down what has been written on the blackboard, as well as the group number (1, 2, 3, 4, 5 or 6) and name on their assignment, they can hand them in for further evaluation. These can be the first piece for their Student Portfolios on this Unit for Science class.

This should take us to the end of the class and Lesson Plan 2.
Remind students about how Aboriginal peoples learned about the cycles of the plants and animals, including their behaviour and cycles, and how this lead to their ability to be able to predict weather patterns and other natural phenomenon, and that we will be discussing this and doing some small group discussion about making weather predictions in our next class.

Lesson Plan 2
Handout

Name: _____ Date: _____

The <u>Six Fundamental Principles</u> that represent the perspectives of Aboriginal peoples and the environment and all living things.

(Listen to what each of the groups' spokesperson says about each of the Principles, and write down some key words and ideas that describe each Principle.)

Principle 1: *Mother Earth is a Living and Viable Entity*

_____
_____
_____

Principle 2: *Indian Values and Nature*

_____
_____
_____

Principle 3: *All Life Forms Are Interrelated*

_____
_____
_____

Principle 4: *Care of Mother Earth*

_____
_____
_____

Principle 5: *Cultural and Social Interaction with Animal and Plant Life*

_____
_____
_____

Principle 6: *The Future of Mother Earth and Mankind*

_____
_____
_____
_____

Lesson Plan 2
Overhead

The Six Fundamental Principles

of the Cree, Dene, Saulteaux, Dakota, Nakota and Lakota World View on the environment and Conservation Principles

Principle 1: Mother Earth is a Living and Viable Entity

Principle 2: Indian Values and Nature

Principle 3: All Life Forms Are Inter-related

Principle 4: Care of Mother Earth

Principle 5: Cultural and Social Interactions with Animal and Plant Life

Principle 6: The Future of Mother Earth and Mankind

STUDENTS, LET'S DISCUSS WHAT THESE PRINCIPLES MEAN TO YOU?

LESSON PLAN 3: ECOSYSTEMS / EARTH'S CLIMATE
Aboriginal Peoples and their Relationship with the Environment and Its Resources

Time: 45 minutes in-class

Materials: - Printed materials in the white binder: Principle III. Lesson 1, *The Blizzard*
- *The Blizzard* overhead – for students' reference.

Evaluation: written assignment / student portfolio

Activity:

- Begin this Lesson Plan by reviewing the Six Fundamental Principles.
- Have students read 1 principle, as well as they points they had written down for that Principle the day before.
- The teacher then writes on the blackboard "Aboriginal peoples studied…" and asked students to end the sentence.
- The teacher then asked students for their opinions on how animals, plants and humans demonstrate their knowledge of the changing seasons (ie, rabbits coats turn white when winter's approaching, etc.).
- Read the story, The Blizzard, to students. Instruct them to listen very closely.
- Before beginning to read, tell students that they should listen closely to the story as they'll be asked to write 2 paragraphs in their Archaeology duo-tangs, using a topic sentence, and proper structure for their paragraphs (at least 15 to 25 words per paragraph.
- The teacher reiterates Brave Bear's actions in the story, and then prompts students to begin writing their paragraphs answering the question *"Describe how Brave Bear practised the law of circular interaction when he fed the animals?"*
- Ask students the questions: How would Aboriginal peoples have studied animals' behaviour?
- Ask them if they think animal behaviour could tell them anything about the climate, including making weather predictions? Listen to their responses.
- Tell students that it was and is through oral tradition, the sharing of stories, that is the way Aboriginal peoples learned about many things in life. And that today, in keeping with the Aboriginal traditions, we are going to learn about something new through the sharing of a story.
- Read the story *The Blizzard* (found in Principle 3, Lesson 1 in white binder). This should take 2 minutes or so to read).

Lesson Plan 3 (continued on next page)

- Ask students to think about the story they've just heard, and discuss the question: *"Describe how Brave Bear practised the law of circular interaction when he fed the animals?"*
- Students will begin completing this assignment during class time. Some may be able to complete this assignment during class time. Ask those who do complete it to hand in their assignment. For those who do not, ask them to take home their papers and complete the assignment to be handed in the next day. Tell them they can draw pictures to complement and/or support their answers to the question.
- Once students have completed their paragraphs (if they do so in class), they can begin working in their "Archaeology" handout in their duo tangs (crosswords, etc.)

This should take us to the end of today's class, and Lesson Plan 3.

Lesson Plan 3
Overhead

THE BLIZZARD

Think about the story, *The Blizzard,* then write down 2 paragraphs answering the question:

Describe how Brave Bear practised the law of circular interaction when he fed the animals?

- Give specific examples of how Brave Bear did this. You may include drawings to support your answers.

- Remember to indent the first line of each paragraph. Remember to use a Topic Sentence at the beginning of your first paragraph. 15 to 25 words per paragraph.

INDENT _____

_____

_____

_____

_____

INDENT _____

_____

_____

_____

_____

LESSON PLAN 4: THE EARTH'S CLIMATE, Using Aboriginal Peoples' Perspectives and Northern Plains Archaeology

Time: 45 minutes in-class

Materials:

- Powerpoint slide document for more detailed information on Northern Plains environmental and technological change since the end of the ice age.
- Overhead: Environmental and Technological Change in Southern Sask. (contact Sask. Archaeological Society in Saskatoon, 664-4124, for a free copy)

Evaluation: presentation; written/drawing assignment; student portfolio

Activity:

- Begin with a brief description of the climate on the Northern Plains. Refer to the overhead, and take students through, from the bottom to the top (near the end of the last ice age in this region), through
- Point to each of the time periods on the overhead, and describe how in the Early Periods, archaeologists have recovered large spear-points which were used in the Early Period (11,500 to 7,500 B.P.-before present) on the Northern Plains to hunt large mammals, including woolly mammoths, camels, and giant bison, that once roamed the Northern Plains. Many students will be surprised to learn that woolly mammoths and camels roamed these lands at one time.
- Instruct students that as the climate changed, this led to a change in food sources for these very large mammals, and that this affected these large mammals, and could have even led to extinction for some in this part of the world.
- Do the same for the Middle and Late Periods (eg. Middle Period: 7,500 to 2,000 BP, atlatl and dart the main hunting weapons, climate change led to a change in the types of grasses and other food sources available to animals of this area, and how modern animals including bison and antelope have been recovered from archaeological sites that date to Middle Period. And so on for the Late Period.
- Instruct students that the climate changes that have occurred in Saskatchewan since the last ice age (about 12,000 years ago), have affected our ecosystems, and how all living organisms, including humans, lived.
- Instruct students that these climatic shifts altered the environment, which affected plans and animals. The affect on plants and animals affected the way humans lived; just the same as plants and animals, humans too had to adapt and adjust to their new environments. This would have affected very much the hunters and gatherers who lived on the Northern Plains thousands and hundreds of years ago.
- Leave the overhead up.

Lesson Plan 4 (continued on next page)

- Ask students to take out their Archaeology duo-tangs, divide a page of paper into three columns, one for the Early, one for the Middle, and one for the Late Period. They should then provide information on each of the three Periods (from what they've just learned), including time frame for each, climate and climate change for each, technological changes, animals present, etc. They should write down in point form, and in drawing, for each of the three Periods.

Students won't likely complete this assignment in-class; allow them to take it home and complete it over the weekend, to be turned in on Monday, evaluated by the teacher, and then put into the Student Portfolio, or onto a wallboard or on the wall, and later into the Portfolios.

- **Lesson 4 complete.**

LESSON PLAN 5: THE CIRCLE AND SEASONAL CHANGES / DIGGING 306

Time: 45 minutes

Materials:

- Film: Practising the Law of Circular Interaction – Aboriginal Peoples' Environment and Conservation Principles – Principle III VHS tape.
- Bristle board circle (with string attached), with the Four Seasons (according to Aboriginal Peoples' perspective: blue, green, white and red quadrants) marked off on it
- Clear container with level of pea gravel, dirt, sand, dirt, with artifact in first level
- 5 thicker text books, labelled with yellow sticky tabs the years 2004 on the top book, 1904, on the second book, 1804 on the third book, 1704 on the fourth book, and 1704 on the bottom book). 3 coins (yellow sticky notes)
- hearth or unit demo (with four levels of materials: ie, pea gravel, soil, sand, soil, and one artifact in level 1) with a popsicle stick and string attached)
- Overhead of index card (more detailed, that archaeologists use)
- Plastic baggie to put artifact into with index card
- Q-tips to clean artifact
- Ruler (to measure the artifact's provenience and the artifact also)
- Scale (to weigh the artifact)

Activity:

- Ask students to hand in their Early, Middle and Late Periods assigned last class
- Begin Lesson Plan 5 by playing the opening 2 minutes of the Film.
- Then, refer to the Bristle board circle on the blackboard, and point out the four seasons, their colours, and the plants, scenery that is associated with each of the four seasons.
- Point out on the bristle board the division into four equal areas, or quadrants.
- Tell students that archaeologists usually divide the area they're working in (called a unit) into four equal areas. Pointing to the circle, and writing N, W, E, W around the bristle board circle, refer to the quadrants by NW, NE, SE, and SW.
- Then ask students in what direction, clockwise or counter clockwise, we just travelled around the circle (it was clockwise).
- Getting more into the relationship between the sun and the earth, now:
- Also tell students that when the earth faces the sun, it is daylight; when the earth faces away from the sun, it is night.
- Tell students that when your part of the world is tilted towards the sun, you'll get more sunlight and more summer.

Lesson Plan 5 (continued on next page)

- Demonstrate how the earth rotates once per year around the sun, all the while maintaining a 23.5 degree tilt always, and rotating once per 24 hours, keeping the 23.5 degree tilt in place, and going around the sun once per year.
- Have students note that it is the tilting of the earth, and how the sun's rays hit the surface of the earth, that determines our seasons, and not how close we are located to the sun's rays.
- Now, mention to students that on Saturday, March 20, will be the first day of Spring, or what is called the Vernal Equinox.
- Ask students what they think is going on between the sun and the earth when the spring equinox is approaching (most will say it's when the sun is closest to the earth – this is a common misconception – nice to be able to clear this up for some students today! – even Harvard graduates routinely misunderstand this scientific concept….)
- Next tell students that as the earth continues to rotate counter clockwise every day, and make its way around the sun (demonstrate what counter clockwise is now using the bristle board circle), by June 21 or June 22, when the earth's North Pole is pointed the most towards the sun, we have the longest day north of the equator, and we have the first day of summer – Also called the Summer Solstice.
- Continue with the depiction of the counter clockwise movement of the earth around the sun, now coming to when the sun's rays hit directly on the equator again, and day and night are each 12 hours. This is the first day of autumn, September 22 or 23, also called the Autumnal Equinox.
- The earth continues to make its yearly move around the sun. When the earth's North Pole is pointed the most away from the sun, around December 21 or 22, we have the shortest day of the year north of the equator, and it's the first official day of winter in the northern hemisphere, the Winter Solstice
- Ask students what they think would be going on in the southern Hemisphere, given the tilt of the earth in relation to the sun. Remind students that the different seasons depend on the tilt of the earth and its relationship to the sun, and not how close different parts of the earth are to the sun.
- Referring again to the bristle board circle, ask students to answer the question "If an artifact was found here (and point to the NW quad in the circle), then which quadrant should we note on our paperwork when we're digging? Do this with all of the four quadrants. Also ask: "Where, in centimetres, is the artifact located in the quadrant? Show students how you would measure this with a ruler.
- Then, excavation demonstration: show students how we'll be digging the next class.

Lesson Plan 5 (continued on next page)

- Using the prepared hearth, before digging point out to students the different levels of stratigraphy, and then talk about the Law of Stratigraphy / Superposition, using the books, coins and tabs with years on them. Take students through a couple of scenarios (How old is this card (between which and which dates), if it is found in this layer?, etc.)
- Take the pre-prepared plastic container with the four layers of materials (pea gravel, soil, sand, soil, with artifact in the first level.
- Begin digging the first layer of the "unit." When I encounter the artifact, show students how I will use my string, and measure
    - the depth of the artifact (from the string),
    - how far (the range) the artifact is away from the centre. I will also weight the artifact. Then, write this information on the index card.
- Put up the Artifact Card overhead, and write on the overhead information regarding the artifact just recovered.
- Put the artifact in a plastic baggie, seal it, and put it aside.
- Put the index card aside for use later when you're noting the weight of the materials taken from each level. Continue digging your level.
- Use an index card for each level, even if you don't find artifacts at a level, you must note the level, and the weight of the materials removed from that level.
- Continue digging, removing level 1. Then weigh the dirt and mark down the weight of the dirt from level 1 on the index card.
- Make sure to have students see the change in soil, from topsoil (darker) to sand. Tell them when we see sand, we can hypothesize that a flood occurred, and when the flood waters receded, it left behind silt and sand.
- **Lesson 5 complete.**

  As we close this Lesson Plan, point out to students that when we encounter really large boulders and stones, and we find no artifacts, and nothing but these boulders and stones, after removing some above them, we have likely come upon what we call Glacial Till, which was left behind when the last glacier retreated, and move northeast, towards the Hudson Bay, about 12,000 years ago.

  Also, remind students about tomorrow's class. Ask them to bring their rules, and a pencil and eraser, as well as their Archaeology Duo tangs. Tell them to wear clothes that are okay to get dirty.

Lesson Plan 5
Overhead

Inner-City Elementary School
The Grade 6 Science Class Archaeology Site
- Artifact Card -

Level of artifact recovered
(according to different types of soil/1 on top, 2 next, etc.): _____

Depth of Artifact (cm): _____

Length of Artifact (cm): _____

Weight of Artifact (grams): _____

Description of Artifact: _____

Excavator: _____

LESSON PLAN 6: DIGGING AT THE GRADE 6 SCIENCE CLASS SITE

Time: 90 minutes (2 classes)

Materials:

- clear, plastic excavation containers (sandwich-sized, square preferred), 2 per student (try
- to get donations from grocery stores, etc.). 1 for the dig/unit, and one to put removed soil into
- plastic spoons (enough for 2/student – in case 1 breaks during excavation)
- artifacts – bones, buttons, coins, beads, broken clay (1 per container)
- pea-gravel, sand, soil (enough for at least 1 layer of each in all containers)
- popsicle sticks (for NW datum points) (1 per container)
- string (to tie to the popsicle stick/datum points)
- scissors (to cut the string)
- black marker (permanent) to mark off the north on the container
- ruler (each student)
- pencil / eraser (each student)
- index cards (asking students for Quad, level, description of artifact, length of artifact, weight of artifact, students name, with the title "Inner-City Elementary School Grade 6 Archaeology Site")
- Stratigraphic Profile/Artifact Provenience handout for Lesson Plan 6

Preparation of excavation containers:

- Prepare the excavation containers ahead of time: bottom: sand, then soil, then sand, then soil.
- Mark "North" with a marker on the container edge
- Place artifacts in level 1 and 3 (soil). One in the NW quadrant, close to the rim in the centre of the quadrant, the second (third level) in the SE quadrant, in the middle of the quadrant.
- Add 1.5 cm of each material.
- Insert the datum point/popsicle stick directly in the centre of the container
- Mark off the level, then tie a piece of string to that point (keep it level). We will use this datum string to measure the depth and location of each of the two artifacts we plant in Levels 1 and 3.

Evaluation: Completed Stratigraphic Profile and Artifact Provenience

Activity:

- Write on the blackboard 4 layers (bottom sand, then soil, then sand, then soil), and tell students that the bottom level goes back 300 years, the third level, 200 years, the second level, 100 years, and the first level to present.

Lesson Plan 6 (continued on next page)

- Before handing out containers, remind students about the Law of Stratigraphy, and why archaeologists are interested in and pay careful attention to changes in stratigraphy. Show them by piling up books and using coin to demonstrate older items are found in lower levels; younger artifacts are found closer to the surface.
- Tell students that they should pay attention to the different layers they encounter. Ask them to stop digging, and to not only stop and do measuring, paperwork, etc when they find an artifact, but that they should also measure where they see the layers change. They should measure from the top of the container, down to the point of the change. Ask students to write information regarding their dig on the handout provided.
- Also, ask students to be careful digging; they may have an artifact in their container (all containers have an artifact). When they find their artifact, they are to stop digging, and measure the depth, note the quadrant, and once this information is written on the artifact card, weigh the artifact also.
- Have the bristle board circle up, and go through the quadrant exercise one final time.
- Also, point to the stratigraphy drawn, and take students through the levels and their date ranges.
- Provide each student with 1 dig container, 1 empty container, 1 plastic spoon, 2 index cards, and 2 baggies.
- Have a supply of extra baggies and index cards available for them also – tell students where they can find them.
- Hand out the Lesson Plan 6 Stratigraphic Profile/Artifact Provenience handout. Ask students to use this handout to note their different strata depths, artifact locations, and any other noteworthy comments they wish to make.
- Ask students to dig carefully; dirt and artifacts should not be flying about—this is not good archaeological practice.
- Remind students to pay close attention to when the layers change, and to measure the depth at which point the change occurs (in centimetres).
- Let the dig begin!
- Walk about the classroom and interact with students; provide instruction to students as they require it.
- Let them dig until 10 minutes or so before the end of class, so they can clean up their work areas, and complete their paperwork (stratigraphic profile and index cards).
- Ask students to place their dig unit and any unmeasured dirt on top of their paperwork, in an area of the classroom where they can be safely stored until Thursday.
- **END OF CLASS – Lesson 6 will continue next class.**

Lesson Plan 6 (continued on next page)

NEXT CLASS:

- Continue with The Dig, following same instructions, doing the same activities.
- Have students dig until they complete all levels and have completed all associated paperwork.
- Ask students to hand in their Stratigraphic Profiles/Artifact Provenience sheets and all index cards. These items can be used for evaluation as students' answers should fall within a range of possible answers. For measurement answers, students' answers should be close to the correct answer.

- **Lesson 6 complete.**

Lesson Plan 6
Handout – Stratigraphic Profile and Artifact Provenience

Name: _____

Date: _____

The Grade 6 Science Class Archaeological Excavation

IMPORTANT:
Use your ruler to measure the depth of the artifact recovered, as well as the depth when level materials change.
Use the scale to take the weight of the artifact.
Note North, then determine what quadrant your artifact is located in from the North point.
You may refer to information on your index cards to complete this handout.

The first change (closest to the surface) in stratigraphy occurs at: ____ millimetres (mm).

Another change in stratigraphy occurs at: _____ mm.

Another change in stratigraphy occurs at: _____ mm.

The first artifact recovered was from level: _____.

The length of the first artifact is: _____mm.

The weight of the artifact is: _____ grams.

The second artifact was recovered from level: _____.

It was recovered from the _____ level.

How old are the artifacts you recovered?
(Hint: Your answer will likely fall within a range of dates for example, between X and X years old.)

First artifact recovered is how old? _____

Second artifact recovered is how old? _____

What do you think the artifacts are (examine the artifacts)?: _____

_____

Describe the first artifact recovered and what you think it is/was used for? _____

_____

_____

Describe the second artifact recovered and what you think it is/was used for?_____

_____

_____

LESSON PLAN 7: CHEMICALS AND REACTIONS AND DATING ARTIFACTS

Time: 45 minutes

Materials: Items you have in the classroom/around home will work, including a piece of leather, a bone, a coin, a nail, a glass bead, a piece of broken china
Overhead: 5 Scientific methods archaeologists use to date artifacts
Handout: What scientific method would you use to date these artifacts?

Evaluation: Handout: What scientific methods would you use to date these artifacts? (already corrected by students)

Activity:

- Ask students to describe what they found during their excavations the day before (take 5 minutes maximum).
- Hold up different types of artifacts that archaeologists may find during an excavation, including such items as a piece of leather, a bone, a coin, a nail, a glass bead, a piece of broken china (or whatever is suitable that you have around home or in the classroom/at the school) (take 1-2 minutes)
- Explain to students that scientists have developed methods to test different types of materials to see how old they are. PUT UP THE OVERHEAD for this lesson (15 minutes)
- For example, explain to students that archaeologists can compare artifacts they already have a date for with artifacts that look very similar.
- Explain to students that if an archaeologist finds a large piece of wood at a site, they can get a pretty good idea of its age by dating it using dendrochronology, or tree-ring dating, which looks at rings on the wood (like you see if you cut a tree trunk in half).
- Tell students that scientists have invented a way to test things that were once living, which are called organic materials, such as plants or animals, using carbon-14 dating.
- Explain to students that volcanic remains, including certain kinds of rocks, can be dated using a method called potassium argon dating.
- Explain to students that pottery remains can be dated using thermo-luminescence, like plants or animals,
- Leaving the overhead up, pass this lesson's handout to students, and ask them to work independently to answer the 10 questions on the handout. Give them 10 minutes to complete the handout.
- Have students exchange their completed handouts with the student behind them.
- Go through handout, asking students to answer each question. Have students correct the paper in front of them. #10 could be a bit of a trick question, as the coin could have a date on it; see if students notice this!
- Once complete, have students hand papers back to student in front of them. Give students about a minute to look over their paper and to hand it in to you for evaluation.
- **Lesson 7 complete.**

LESSON PLAN 7: CHEMICALS AND REACTIONS
Overhead: 5 scientific methods archaeologists use to date artifacts

1. **COMPARATIVE DATING**: archaeologists can compare artifacts they already have a date for with artifacts that look very similar).

2. **DENDROCHRONOLOGY**: or tree-ring dating, which looks at rings on the wood (like you see if you cut a tree trunk in half)

3. **CARBON DATING** (carbon 14): used to date organic materials (things that were once living, including plants and animals, and of course, human beings).

4. **POTASSIUM ARGON DATING**: can be used to date volcanic remains, including certain kinds of rocks.

5. **THERMO-LUMINESCENCE DATING**: pottery remains (potsherds and vessels) can be dated using this method.

LESSON PLAN 7: CHEMICALS AND REACTIONS
Handout – What scientific method would you use to date these artifacts

Name: _____

Date: _____

If you were an archaeologist, what dating methods would you use to date these different artifacts?:

1. bronze axe blade? _____
2. piece of charcoal? _____
3. skull fragment? _____
4. roof beam? _____
5. decorated pottery? _____
6. wooden sarcophagus? _____
7. layer of volcanic deposits? _____
8. dried corn kernels? _____
9. piece of a leather sandal ? _____
10. a coin? _____

LESSON PLAN 8: VOLCANOES: "POMPEI, OUR VESUVIAS"

Time: 45 minutes

Materials:
- Pompeii story ((page 41 in #296 Thematic Unit on Archaeology)
- Map of Italy (tape to blackboard, or use classroom pull-down map)
- Map of the North, including Alaska (tape to blackboard, or use classroom pull-down map)

Activity:

4. Read the story about Pompeii to students
5. Show them a Map of Rome, and point out the area where Vesuvias is located before reading the story.
6. Show a map of north, including northwestern Alaska, including the range of mountains including Mt. Elias.
7. Describe to students how a volcanic eruption occurred in Western Alaska about 1270 years ago, around A.D. 700, in the Mt. Elias range.
8. We know this date due to radiocarbon dates done by archaeologists on organic materials (remind them of yesterday's lesson-dating methods).
9. The eruption at the St. Elias mountain range in Western Alaska was devastating. Pumice, lava and fine ash erupted out of the volcano and into the sky.
10. The ash, called White River Ash, spread far (1000 km east) and deep (up to 150 cm deep in some places – mostly mountain sides. Because a lot of the ash settled on mountain slopes, scientists theorize that it was wintertime when the volcano erupted: the ash mixed with the snow, as it was falling, and settled on the mountain sides. If it was any other season, rain would have eventually washed the ash from the mountain slopes.
11. The people living in the area affected by the volcanic eruption were ancestral Dene. (You could ask students if they are or if they know anyone who is Dene.)
12. How the archaeology comes into this: An archaeologist working in the southern Yukon Territory noticed an ash layer consistently showing up in his stratigraphy-even at different sites in the region. This ash layer is what radiocarbon dates to approx. 1250 ya.
13. Ask students to think about what life would have been like for these northern forest hunters and gatherers.
14. Most of the year, people would have lived in small family groups; they would have had occasional contact with relatives, friends and acquaintances as they moved around. Remember, these were a nomadic people who would hunt and gather in order to make and provide a living for their families and themselves.

Lesson Plan 8 (continued on next page)

- In the case of the Dene who lived in the area affected by the volcanic eruption, many of them exploited (another word for "collected") salmon during summer runs. As autumn approached, people would move in groups to areas where they could live and collect food resources. Men would hunt caribou, moose and mountain sheep, and women and children would care for families and relatives, collect food including the hunting of small game such as rabbits, birds, etc., prepare food, prepare hides, make clothing, make baskets, and other tasks as necessary. The home and all that is associated with it was the female's domain in the Dene culture.

15. Women also taught the children through the telling of stories. This is called the Oral Tradition.
16. Through Dene oral tradition that continues to be shared today, we know about how people felt and how they experienced the volcanic eruption of A.D. 730, 1270 years ago.

- One man said he smelled a bad smell in the air. .
- Another man said that the dogs between to howl, and that snow began to fall the next night after the eruption.

17. The thunder and lightening of the electrical storm that followed the eruption was not common in the winter. In fact, it just didn't happen in winter, up until that fateful day 1270 years ago.
18. Darkness persisted all day and night – stories describe the night as being darker than a moonless night.
19. The drinking water that the Dene collected was murky, and thick with ask and silt. It was not healthy to drink.
20. The thick ash made it difficult for animals to walk and run; this meant that the caribou and other animals in the area were probably easier to hunt and take down.
21. However, the plants and other things that these animals normally ate were covered with an ash layer; these animals either got very sick or died of poisoning or starvation, or they left the area in search of food.
22. The salmon were affected by the volcanic eruption. This led to no salmon run the following summer because the salmon did not travel upstream in the fall to replace their eggs. A main food resource for the Dene had been decimated.
23. This volcanic eruption caused people who lived in the area to move northward, or southward. There is interesting archaeological and linguistic evidence to support this theory.

Lesson Plan 8 (continued on next page)

24. More archaeology: Archaeologists have recovered artifacts from a layer above the ash layer (after the eruption) that are stylistically similar to artifacts recovered from layers laid down before the volcanic eruption (below the white ash layer). Who were these people that reoccupied the area? Were they the same people who left the area, or were they ancestors to them, a generation or two removed?
25. Reiterate to students what life would have been like in this area approximately 1270 years ago: The Aboriginal peoples who occupied these lands lived in small bands, with the men going off to hunt migrating herds of caribou and other animals, and women collecting plants and other food resources closer to the home range – with their extended families travelling with them.
26. Then, present the following scenario: Ask students to try to place themselves in this time period, keeping in mind what they've just heard about how life was for the Dene people during this time. Discuss how this event affected ecosystems in the area. Let the discussion proceed until the end of class time.
27. **Lesson 8 complete**.

LESSON PLAN 9: What we learned during the Archaeology Unit

Time: 45 minutes

Evaluation: Written paragraph: A letter to Ms. Karner

Activity:

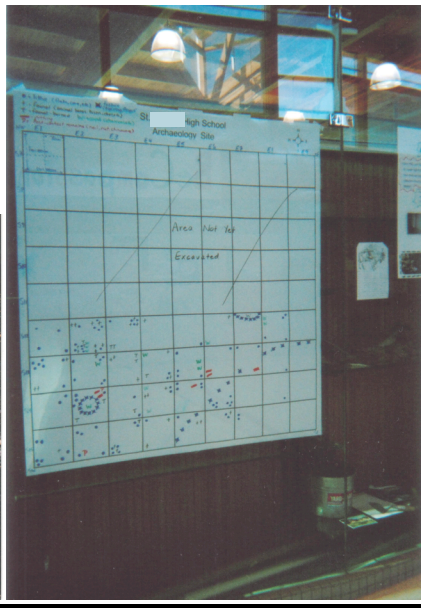
We can review the various concepts we've been discussing over the past two weeks:

1. Ecosystems (all living things, and how they interact)
2. Mother Earth
3. Biodiversity
4. the circle of interaction
5. Aboriginal peoples living in balance/harmony with the earth
6. Wanuskewin Heritage Park, and its biodiversity
7. Climate Change (Brave Bear, etc.)
8. Climate Change on the Northern Plains (early, middle and late periods)
9. How seasons are created: the sun and earth and their relationship
10. How archaeology can tell us about the past, present, and maybe the future
11. The care involved in archaeological work – why is it important to be careful?
12. Stratigraphy
13. Law of Superposition
14. Different methods archaeologists use to date different types of artifacts (organic, lithic, pottery, other)
15. How volcanic eruptions affect living things (ecosystems): Pompeii and St. Elias range in Alaska (and how it affected the Dene
16. Ask students to choose three things they'd like to discuss, and write a paragraph about each. It should be in the form of "A Letter to Ms. Karner."
17. Students should complete this work, to be handed in on Wednesday for evaluation.

END OF THE GRADE 6 SCIENCE ARCHAEOLOGY UNIT

APPENDIX G

ARCHAEOLOGY UNIT: SUBURBAN HIGH SCHOOL



Grade 9 Social Studies Core Units:
- Time
- Culture: First Nations Roots

ARCHAEOLOGY UNIT CONTENTS

Lesson 1
- An Introduction to Archaeology
- What is Archaeology
- Why Is It Important To Know About the Past?
- An Archaeological Site: What Is A Site?
- What Do Archaeologists Find: Artifacts, Features and Ecofacts
- Pre-Contact and Post-Contact Archaeology: What's the Difference?
- Rock Art
- The Tools Archaeologists Use: What Are They
- The Archaeology Crew: Who Are They And What Do They Do?
- Analyzing and Interpreting the Meaning of Artifacts: Questions We Can Ask and Try to Answer
- Rules of Archaeological Excavation

Lesson 2
- Artifacts: Show and Tell and Film on Excavation Methods

Lesson 3
- Tour of the High School Archaeological Site

Lesson 4
- Bison of the Northern and Great Plains
- Film: The Secrets of Wanuskewin, including lesson and film
- The Generous Bison
- Seasonal Migration

Lesson 5
- Bison of the Northern and Great Plains – continued:
- The Bison Past and Present:
- The Effects of European Contact on the bison and the people of the Northern Plains
- The Bison Past and Present: The Effects of European Contact on the Bison and the people of the Northern Plains
- Bison Hunting on the Northern Plains: Descriptions of Three Methods

Lessons 6-9
- Excavation, Labwork and Artifact Analysis, Interpretation Activity, Display
- Excavation
- Lab work: cleaning, weighing, measuring, analyzing and cataloguing artifacts
- Interpretation Activity
- Creation and Set-up of Archaeology Display

LESSON 1:
An Introduction to Archaeology

WHAT IS ARCHAEOLOGY?

Ask the students what they know about archaeology? What do they think it is that archaeologists do?
(LET STUDENTS ANSWER)

The word "archaeology" comes from the ancient Greek words: arkhaios, which means old, and logos, which means theory or science.

Archaeology is one way of studying the past. People who live at a place, whether for a short period of time or for a long time, will usually leave clues behind, either on or in the ground. Archaeologists study the remains, or some might call it the garbage, that people leave behind.

The work of an archaeologist is similar to that of a detective in that we work carefully, following certain methods, to discover more about the people who lived there.

WHY IS IT IMPORTANT TO KNOW ABOUT THE PAST?

Would anyone like to volunteer and tell us why they think it is important that we know about our past, or the past events that occurred on this land upon which we live?
(ALLOW STUDENTS TO RESPOND)

It is important to know about where we come from, who we are, and how we think and behave, and about other people who lived on these lands before us because every discovery we make about ourselves and about other people who came before us increases our understanding of the world around us, a world that was shaped by people's actions and the events of the past. A lot of what influences our lives today is linked to the past.

AN ARCHAEOLOGICAL SITE: WHAT IS A SITE?

An archaeological site is a place that archaeologists have identified as being an area where people once lived and where they left material remains, which have been found either by accident or through surveying or cultural resources management, and where a systematic, methodological examination of the area by archaeologists has led to the recovery of artifacts.

Many archaeological sites are found quite by accident. Let's suppose you're walking along a farmer's field, or a river valley, and you see something on the ground, perhaps laying near a gopher hole, you pick it up, take a look at it, and realize it is a projectile point, or anything else that looks like it has been made or used by a human being, then it is an artifact. When this occurs, the best thing you can do is to stop, take note of where you are, perhaps stick a piece of wood, fabric, make a pile of stones at the point where the artifact is located (basically do something or create something that will allow the area to be found at a later date), leave the artifact where you saw it, and then contact your local archaeological society or university so that people with more experience in identifying potential archaeological sites can return to the area and do further inspection to determine whether or not the area is worth more study. It is so important that you be sure to contact the proper authorities when we come across something that could be an artifact. For instance, if I found something lying on the ground that looked like an artifact, and instead of reporting it to someone who has the experience and expertise to come back to the area and take a closer look to see if it is, in fact a site, and instead, I put it in my pocket, and never reported, I am doing a great disservice to everyone as this could be an artifact that represents a much larger, even important archaeological site, and the information that could be gleaned through the further investigation of that site and area is never able to be pursued, and the potential information we could gain from this site is lost forever. Archaeologists frown upon this type of conduct.

Can anyone tell me where one might look for an archaeological site?
(LET STUDENTS ANSWER)
<u>Some responses</u>:

- construction site
  (for example, the St. Louis site, about an hour northeast of Saskatoon, was discovered during regular cultural resources management work that must occur as part of the environmental assessments that go on with any building of highways or bridges in Saskatchewan. It's fortunate that archaeologists have discovered this site as it is likely the oldest archaeological site that we have recovered so far in Saskatchewan, and from it archaeologists recovered skulls of now-extinct species of bison.
- ploughing (farmers' fields)
- surveying
- aerial photographs
- old maps
- diaries and newspapers
- erosion / cutbanks
- books and documents

WHAT DO ARCHAEOLOGISTS FIND?
-- ARTIFACTS, FEATURES, AND ECOFACTS --

Can anyone guess what types of things archaeologists find? (Have students respond.)

The material remains archaeologists recover and analyze items as simple as a stone tool, or something as elaborate as a medicine wheel or a beautiful palace.

If someone doesn't use the term "artifact," mention it now. If they do, then tell students:

An artifact is anything that was made or was used by people. Artifacts are important clues for archaeologists as they tell us where people lived, how long ago people lived, and also something about the daily lives of people.

So, it is an archaeologist's job to describe, classify and analyze the artifacts that are found. This will make more sense to you after tomorrow's class, when we will take a look at some actual artifacts and do a classification activity.

Archaeologists also recover remains we refer to as features. Features are non-portable, or non-movable remains including such things as tipi rings, hearths, foundation walls, stone and boulder alignments or effigies, pyramids, temples, rock art. We will learn more about features as we begin our excavations outdoors later this week.

Ecofacts are material residue of the environment, such as plant residues. There are two types of ecofacts, those that we call cultural ecofacts which reflect human activity, and environmental ecofacts which directly represent natural phenomena. We will discuss this in more detail a little later.

PRE-CONTACT AND POST-CONTACT ARCHAEOLOGY:
WHAT'S THE DIFFERENCE?

In the field of archaeology in Canada, there are two ways in which archaeologists assign time periods to the artifacts we recover:

1. Things we recover that date to the time before European contact, which we mark as a time before people kept written records, which, in this area of the world, was around 1750, is called pre-historic or pre-contact archaeology. Some people, including archaeologists, prefer to refer to this period as "precontact" as the term "pre-historic" implies "before history," and it is obvious that everyone, regardless of when they lived, how they lived or whether or not they had written records, people still have a history.

2. The second designation we use is "historic" or "post-contact," which means after the time of European contact, or from the time when people kept written records. Again, some people, including archaeologists, prefer the term "post-contact" for the same reason previously described.

ROCK ART

Aboriginal people all over the world, including here on the Northern Plains, created something archaeologists call Rock Art. Rock Art comes in two forms:

1. Pictographs, which are drawings on large rocks or on rock/cliff walls
2. Petroglyphs, which are carvings into large rocks and on rock/cliff walls.

There presently exist many significant rock art sites in Saskatchewan, including along the Churchill River system, the St. Victor Petroglyphs, and the Herschel Petroglyph.

Although we can't say for sure what the people who created these drawings were trying to communicate, but we might suggest that rock art served as a form of communication for Aboriginal peoples all over the world. We must keep in mind that communication doesn't have to be just in the verbal sense. We can communicate through drawings and through our art too!

THE TOOLS ARCHAEOLOGISTS USE: WHAT ARE THEY?

When an archaeologist is ready to excavate, we gather and then later use in the field these tools (show some of them):

- trowels
- whiskbrooms
- dust pans
- screens
- pails
- shovels
- grapefruit knives
- root clippers
- brushes (all sizes)
- measuring tapes
- line levels and string
- writing tools (markers and pencils)
- artifact bags
- excavation record forms
- rubber or latex gloves
- cameras
- compass
- computers
- ground penetrating radar and other survey equipment
- global positioning satellite (GPS) units
- and don't forget water, a hat, suitable clothing including footwear, and sunscreen and insect repellent.

THE ARCHAEOLOGY CREW:
WHO ARE THEY AND WHAT DO THEY DO?

There are many jobs that archaeologists do, and most archaeologists have experience in doing many of the different tasks that are done during an archaeological excavation:

- some people do surveying of a potential or identified site
- some people lay the grid and delineate units
- some people excavate or dig
- some people measure artifact provenience
- some people record such things as artifact provenience and other data
- some people screen dirt and pick artifacts from the screen
- some people wash and sort artifacts
- some people catalogue artifacts
- some people do laboratory analysis and computer data entry
- some people photograph artifacts and other important things
- some people shovel dirt away from the screening areas
- some people guide visitors to the site

Advise students that when they go outside to excavate at the school's site, they will have an opportunity to perform many of these different aspects of the job of an archaeologist.

ANALYZING AND INTERPRETING THE MEANING OF ARTIFACTS:
QUESTIONS WE CAN ASK AND TRY TO ANSWER

No matter where an archaeologist is excavating, there are some basic questions that we try to answer through the analysis of the artifacts and features that we find. For example, we would always want to ask and try to determine:

- How old is the site?
- Who may have occupied the site?
- What different kinds or classifications of artifacts have been recovered from the site?
- How did the artifacts come to be where they are in the site?
- How were these artifacts made and used?

As suggested earlier, archaeologists' work is similar to that of detectives in that they must carefully analyze and record all of the evidence that remains at the scene (this means they study the artifacts, features and ecofacts they recover), then they must remove any objects that may yield scientific evidence, and then they must try to draw inferences from this material, in comparison to other artifacts and features recovered from not only that site, but also to materials recovered from other archaeological sites in the vicinity. The information we collect through these analyses and interpretations can help us better understand what may have taken place in the past at the site.

THE RULES OF ARCHAEOLOGICAL EXCAVATION

At the end of class, hand each student a copy of the General Rules for Archaeological Excavation.

Instruct students to review these rules, so they will be ready and able to excavate when we move outdoors and continue our studies in the Time, and Culture: First Nations Roots Units.

Optional: 10-question quiz before students begin excavations.

Optional: Students have to earn a grade of 70% or more, or at least 7 or the 10 multiple choice questions correct, in order to excavate. Also, please bring the rules and the key terms with you to class every day as we'll be referring to them when from time to time.

SUBURBAN HIGH SCHOOL:
GENERAL RULES FOR ARCHAEOLOGICAL EXCAVATION

(Please read and familiarize yourselves with this information. Rule 19 is especially important! **)**

The following are some practical pointers for good excavation techniques.

1. When you encounter something in digging -STOP! Do not immediately pull it out of the ground. It has been there a long time and a few more minutes won't hurt it. Gently expose the object without disturbing it and investigate an area of least 40cm radius about it to determine whether it is isolated or associated with other objects.
2. Use care in cleaning finds. Do not beat, scrape or rub them violently. Use the soft brushes and water provided.
3. The scientific record of the pit you dig is dependent upon you alone. Everything you miss will be lost forever, therefore:

    - Do not avoid recording data because of unfamiliarity, laziness, or bad weather. Properly record ALL finds- the notes are worth the effort.
    - If you encounter something you are unfamiliar with, DO NOT DISCARD IT - call the supervisor - that's what he/she is there for.
    - Be scrupulously honest in note-taking. Don't be ashamed of admitting to, and making, mistakes or inadequacies in your previous work. It is infinitely better to do so than to have errors accumulate and cause problems down the road. If you do not know exactly how to do something, call the supervisor.
    - Take the time to keep all notes complete and up to date. Don't scribble notes on old gum wrappers, or attempt to carry them in your head. Remember that the purpose of the project is "ACCUMULATION OF INFORMATION," not maximizing the amount of dirt removed. Notes are more valuable than artifacts.
    - Be accurate, consistent and specific in observations. Use "25 cm" instead of "20-30 cm" use descriptive terms consistently and specifically; don't guess at measurements.
    - Keep your records, drawings and labels neat, clean and readable. If necessary re-write them every evening. Use another non-erasable ink (not pencil) for notes and bag labels.

4. Ensure that bags are properly labelled in ink before they are filled. Labels should include the site number; horizontal and vertical positions; content description; level number; level description; name of excavator and date. Replace any bags weakened by moisture and double-up bags intended to hold heavy objects.
5. Always keep your pit as neat as possible. Do not leave discarded bags, paper, or other garbage around the edges. Do not accumulate large piles of back-dirt in the bottom. If the screens cannot keep up to your rate of excavation take some time off and write up notes.

(cont. next page)

6. Keep pit walls vertical and corners at a true 90 degrees. From time to time sight down the top of the walls or drop a plumb-bob and carefully trim the walls to a straight vertical face. This is important since uneven walls will affect the accuracy of horizontal measurements. Cut off protruding roots flush with the profiles.
7. Do not gouge into walls or "rip-out" artifacts, bone or rocks that won't readily fall out on their own. These materials can be properly excavated later by sinking adjoining pits, or they can be recorded and recovered after the profiles have been drawn.
8. Do not dig below the floor of your level before it is complete.
9. Bag and record all materials immediately upon their removal. Do not leave artifacts or leave bag material lying on the edge of your pit.
10. Avoid walking on or otherwise disturbing artifacts, features, or completed floors before they are fully drawn and photographed. Ask permission before jumping into someone else's excavation unit.
11. Avoid walking or sitting on the edge of your pit, and keep visitors away from the edges.
12. Never let excavations become dangerous. Shore-up pits over 1.2 m (4') deep and use proper safety equipment (e.g. hard-hats in deep excavations).
13. Try not to trip over strings and do not disturb vertical points.
14. Do not place trowels or other sharp objects in your pockets...!
15. Five Commandments of good excavation procedure:

    - Use your common sense;
    - When in doubt -STOP- call the supervisor;
    - It is far better to take too many notes than too few;
    - Keep your eyes open and your mind active. The next "bones and stones" are the only memorial for once living, breathing, feeling human beings.
    - Have respect for the remains of the past. These "bones and stones" are the only memorial for once living, breathing, feeling human beings.

16. At no time should artifacts be manufactured on the site except, perhaps, in a limited area set aside for the purpose of replication experiments.
17. Always be patient and courteous with visitors and encourage their comments and questions. All field workers will be viewed as representatives of the professional discipline of archaeology.

(cont. next page)

18. Archaeologists are concerned with the conservation and proper management of historical resources and should practise similar restraints with other aspects of the natural environment. Wherever possible archaeological projects should try to inflict only minimal damage and disruption to the environment. Back-dirt should not be allowed to foul streams of beaches; destruction of vegetation should be kept to a minimum and crews should not hurt or kill animals without very good reasons. Crews have a basic responsibility to completely back-fill excavations and leave the environment as close to the way that it was found as possible.

19. *** Wear suitable clothing, such as: t-shirts, pants, runners or hiking boots. Tank tops, short shorts, and open-toed sandals or shoes are not recommended.

****

Rules adapted from:

Fladmark, Knut R.
1978 A Guide to Basic Archaeological Field Procedures. Simon Fraser University, Burnaby. Electronic document, http://collections.ic.gc.ca/archaeology/second/archaeology/science/miscellaneous/rules.html, accessed September 2003.

* An addition by M. Karner.

ARCHAEOLOGY QUIZ FOR GRADE 9 SOCIAL STUDIES

Keeping in mind the rules that you've read in the General Rules for Archaeological Excavation handout and what you've been taught in class, circle the letter (a, b or c) that you think is the best response to the question. Only 1 answer will be accepted for each question. There are no trick questions. You will be given 10 minutes to complete this quiz.

1. You're trowelling, when suddenly you hear a "clink" sound. You:
   a) continue to trowel and try to reveal what is there
   b) put down your trowel, pick up a brush, and brush gently around the item to reveal what it is
   c) drop your trowel right away, and pull the item out of the ground

2. It's cold outside and you still have 1 bone left to measure, write up records for, and bag. You:
   a) quickly pack up your equipment, head indoors to warm up, then return later to finish measuring, records, bagging, etc.
   b) pull out your tape measure, line level, records and forms, pencil, plastic bag, and finish the job
   c) pull the bone out of the round and throw it away when you think no one is looking

3. The only way to access your unit is by walking through the one located right next to yours. You:
   a) ask your colleague working next to you if you can enter into their unit. Once they grant permission, you carefully enter into their unit, then into your own
   b) don't ask—just go ahead and enter your unit via your neighbour's
   c) jump over your neighbour's unit and into your own

4. The best place to keep your trowel when you're not using it is:
   a) in your back pocket
   b) on the ground in your unit
   c) on the edge of your unit

5. You're trowelling and you reveal something you can't immediately identify. You:
   a) pull the item out and throw it away
   b) pull the item out, look at it, then put it back in the ground somewhere in the quadrant you were excavating
   c) ask your unit supervisor to assist you in identifying the artifact

(continued next page)

6. The excavation time has ended for the day, but you're not done with your paperwork. You write up your paperwork as quickly as you can and realize you've made an error. You:
   a) pack up and call it a day--you can correct the error tomorrow
   b) don't worry about the error—who is going to notice it anyway
   c) correct the error right away, then finish up your paperwork.

7. You're trimming your vertical wall to attain a 90-degree angle, when you see a bone sticking out of the wall. You:
   a) leave it--It belongs to the unit next to yours
   b) begin trowelling around the bone to get a better look at it
   c) call the people excavating next to you to come and take a look at what you've recovered

8. You place a large bone in a plastic bag, then realize the bag has a small hole in it. You:
   a) tie the bag up as tightly as you can—the bone won't fall out of this small hole
   b) replace the bag with one that is the right size, then secure it well
   c) take the bone out of the bag and place it into your artifact box

9. It's the end of the excavation day, and your handwriting has become atrocious. You:
   a) continue to write your notes, even if they're not legible.
   b) slow down, and rewrite your notes so they can be read at a later date
   c) dictate to one of your colleagues working with you what notes should be written on the records—let him/her do the writing instead

10. Vertical walls should be at what angle?:
   a) 45 degrees
   b) 180 degrees
   c) 90 degrees

END OF QUIZ!

LESSON 2:

Artifacts: Show and Tell

Film on Excavation Methods

Artifacts: Show and Tell (30 minutes)

*** It is recommended that a U of S Department of Archaeology and Anthropology undergraduate and/or graduate student come into the class to present and describe these artifacts.

Film: "Basic Archaeology Methods: An Introduction to Excavation" (15 minutes)

Optional: Ask students to study General Rules for Archaeological Excavation for Quiz (do before excavation)

****

ARTIFACTS: SHOW AND TELL

** Using Edu-Kit, Northern Plains Projectile Point Display, and artifact collection – Edu-Kit and Northern Plains Projectile Point Display borrowed from the Saskatchewan Archaeological Society, and the lithics/faunal/ceramic collection borrowed from the U of S Department of Archaeology and Anthropology (see last page of this lesson for details on borrowing these resources)

Students will be shown a variety of lithic (stone), pottery, and faunal (bone) artifacts. Lithic materials will include a projectile point display which includes most of the point styles identified as being of the Northern Plains classificatory system (replicas and artifacts). Other lithic materials include scrapers, grooved mauls, mortar and pestle, and other stone tools found on the Northern Plains. Pottery materials will include a variety of potsherds found on the Northern Plains. Faunal materials will be primarily Bison bison. Students will have an opportunity to handle many of the artifacts.

Next, watch the **film, "BASIC ARCHAEOLOGY METHODS: AN INTRODUCTION TO EXCAVATION,"** which describes basic archaeological excavations. Students should be instructed that they will be applying the very same methods they see in the film in the field when they conduct their excavations. This film was made at the Newo Asiniak site located in Wanuskewin Heritage Park. This film will last approx. 15 minutes.

Teacher Resources:

Artifact Collection: Faunal, Lithics, Ceramics available from the University of Saskatchewan, Department of Archaeology and Anthropology Contact: Dr. Ernie Walker, 306-966-4181, or the Main Office (to leave a message for Dr. Walker) at 306-966-4175. He will arrange for a collection of artifacts to be put together, and someone from the school will have to pick up and return same.
*** It is recommended that an Archaeology major undergraduate, or an Archaeology graduate student come into the class to present and describe these artifacts.

Archaeology Edu-Kits and Northern Plains Projectile Point Display: suitable for all school grade levels, are available for loan to members of the Saskatchewan Archaeological Society, Contact Tim Jones, #1 - 1730 Quebec Ave., Saskatoon, SK, S7K 1V9, phone: 306-664-4124, fax: 306-665-1928, email: saskarchsoc@sasktel.net

Film: "Basic Archaeology Methods: An Introduction to Excavation," available for loan from: University of Saskatchewan, Division of Media and Technology, Room 25, Education Building, 28 Campus Drive, Saskatoon, Saskatchewan, Canada S7N 0X1, Phone: (306) 966-4271, Fax: (306) 966-2412, General Inquiries: dmt@usask.ca

LESSON 3:
Tour of the Suburban High School Archaeological Site

Teachers and the archaeology supervisor will take students outdoors and show them the School's site. Students will also be asked to recall what they saw in the film the previous day, and will receive instruction by the archaeology supervisor and teacher on the following concepts and activities:

1. They will instruct students about the main datum point for the site and why and how it's established.

2. They will instruct students about what a unit is: a $1m^2$ square.

3. Students will also be instructed about the location of cardinal directions (N,S, E, W), and their relationship to the site and its units.

4. Students will be shown how each unit receives its designation or name, in relation to the main datum point.

5. The tour of the site will end with the instructor providing a basic lesson in excavation methods. How to divide the unit into 4 equal quadrants using a measuring tape; the name of each quadrant (NW, NE, SE, SW), how to begin trowelling, what to do when an artifact or something of interest is encountered while trowelling, how not to trowel, how to measure the in-situ, 3-dimensional location of artifacts/features, how to handle artifacts once measured, how to do paperwork, etc.

6. Students will be reminded of the General Rules for Archaeological Excavation as well.

LESSON 4:
- Bison of the Northern Great Plains
- Film: "The Secrets of Wanuskewin"
- The Generous Bison
- Annual Seasonal Migration of the Northern Plains Bison

Film: The Secrets of Wanuskewin

** The School's Library has a copy of this videotape.

The Generous Bison

Bison was a very important source of food and supply of essential goods to the people who lived on the Northern Plains. As you learn more both in and outside class, during the excavation, you will find out how the bison supplied Aboriginal peoples with food, hides, and a variety of other goods – bison is considered the original one-stop shopping.

How bison were used by the people of the Northern Plains.

- hand out picture of bison, with 1-19 bison parts, and uses
- put up the overhead of the bison, with 1-19 numbered areas. Name a few of the body parts, if students seem to be having difficulty identifying some.
- give students 15 minutes to identify as many of the bison parts, and their uses.
- refer to the 2-page handout, entitled "The Bison Supermarket" and read off what each of 1-19 are, as well as some of the uses of these parts of the bison.
- students should copy down at least one use for each of the 1-19 bison parts in their notes
- this activity can be handed in and evaluated/graded, OR checked in class

Annual Seasonal Migration of the Northern Plains Bison

Put up overhead, Seasonal Migration of the Northern Plains Bison

Use a map of North America to show students the extent of the migration route. Also draw on the blackboard the clock-wise or counter-clock-wise migration pattern. You should make a complete circle from the winter to fall and then back to winter migration route.

Bison that lived on the Northern Plains exhibited very interesting behaviour, something scientists call seasonal migration.

In the winter, bison would migrate northward, to the parklands area, north of Saskatoon, where they would seek protection and shelter from the harsh winter winds and weather, and where they could have access to a certain supply of grasses and water in order to survive the harsh winters.

Then, when the snow would melt and disappear in the early spring, the bison would move southward, to the southern plains in Saskatchewan and the United States, where they would graze on the very nutritious short grasses that were available in these areas, and also to give birth to their calves.

In the late summer, the bison would mate (the "rut").

Then, in the fall, just before winter set in, the bison would migrate northward to the parkland area, and the seasonal migration would complete its circle.

Teacher Resources:

Video: The Secrets of Wanuskewin. A copy of this video is in the School's Library.

Overhead: Picture of bison: for students to identify 19 parts of the bison, and their uses. Accompanied by a two-page answer sheet (both items from the People in Their World series).

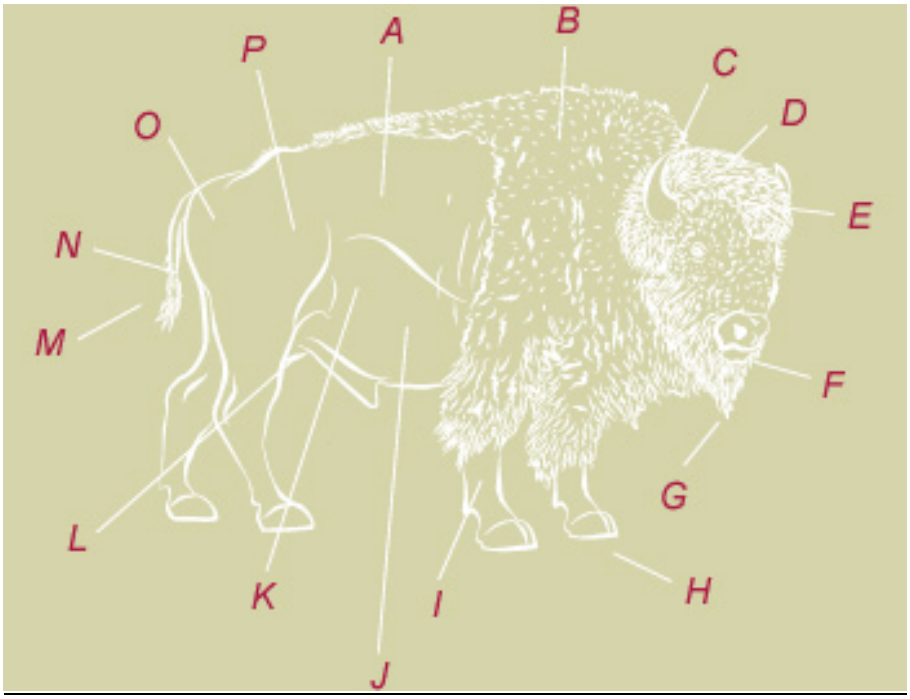
Overhead: Seasonal Migration of the Northern Plains Bison (Winter, spring and summer, late summer and fall) (2-page document).

Black, Deborah
2000 *Hunting Tools Teacher Information*. People in Their World series. D. Black Communications Inc., Saskatoon, Saskatchewan.

Linnamae, U. and T. E. H. Jones.
1988 Out of the Past. Saskatchewan Archaeological Association, Saskatoon.

Walker, E. G.
1992 The Gowen Sites. Canadian Museum of Civilization, Hull, PQ.

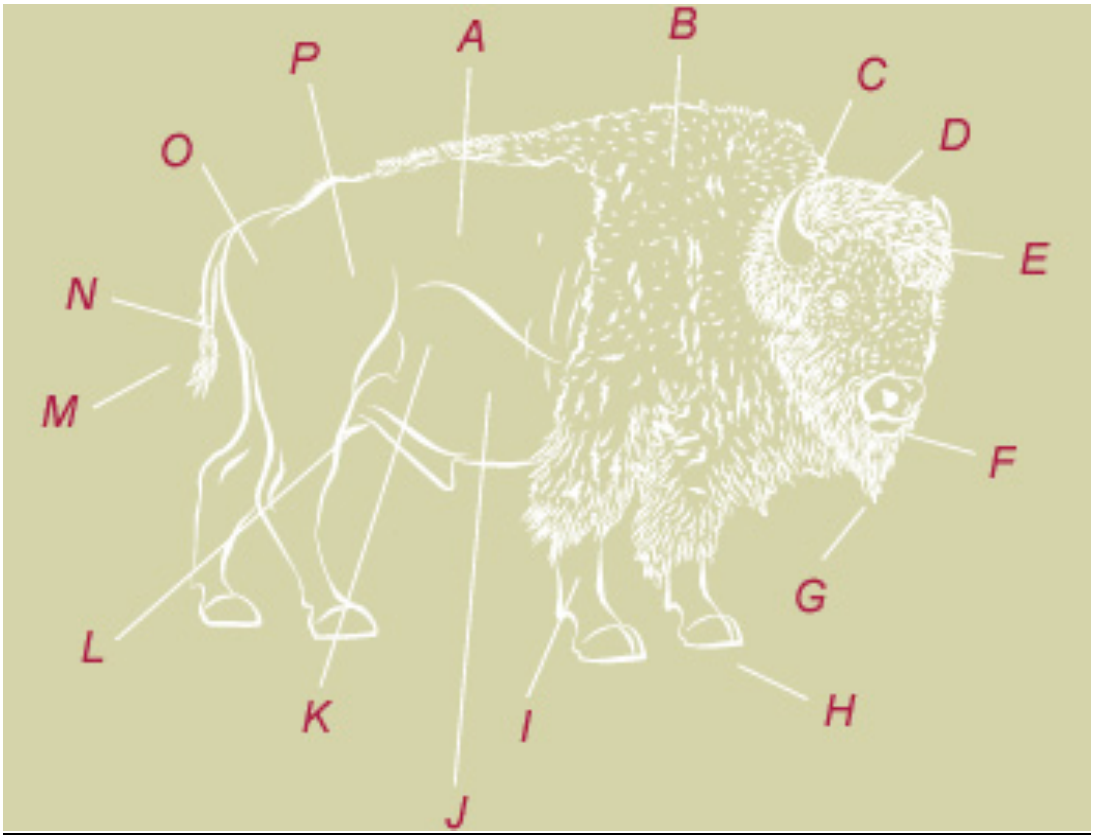
LESSON 4:
Bison of the Northern Great Plains (cont.)
The Generous Bison
Overhead / Handout



Drawing: Susan Laurie-Bourque, Canadian Museum of Civilization, www.civilization.ca/aborig/fp/fpz3b06e.html. Adapted from "The Bison Supermarket of the Plains," Helgason, 1987:132.

Bison Part:		**Use(s):**
A	Sinew	
B	Hair	
C	Horns	
D	Skull	
E	Brain	
F	Tongue	
G	Beard	
H	Hoof / Foot	
I	Marrow	
J	Meat	
K	Internal Organs	
L	Scrotum	
M	Tail	
N	Buffalo Chips	
O	Hide	
P	Bone	

LESSON 4:
Bison of the Northern Great Plains (cont.)
The Generous Bison
Answer Sheet – Page 1 of 2



Drawing: Susan Laurie-Bourque, Canadian Museum of Civilization, www.civilization.ca/aborig/fp/fpz3b06e.html. Adapted from "The Bison Supermarket of the Plains," Helgason, 1987:132.

Bison Part:		Use(s):
A	Sinew	thread, bow strings
B	Hair	padding, woven into belts/ropes, ornaments
C	Horn	cups, spoons, spinning toys, ornaments
D	Skull	ceremonial (used as part of the shrine in a Sundance)
E	Brain	hide tanning (removed fat from the hide)
F	Tongue	meat
G	Beard	ornaments
H	Hoof /Dewclaws	rattles, glue
I	Bone Marrow	food, soup
J	Meat	roasted, boiled, dried, prepared as pemmican

(cont. next page)

LESSON 4:
Bison of the Northern Great Plains (cont.)
The Generous Bison
Answer Sheet – Page 2 of 2

K	Internal Organs	food, containers
L	Scrotum	rattles, game balls
M	Tail	ceremonial, ornamental
N	Buffalo Chips	fuel
O	Hide (w/o hair)	tipis, clothing, moccasins, containers,
P	Bone	food, knives, tools, ornaments

LESSON 4:
Bison of the Northern Great Plains (cont.)
Bison Annual Seasonal Migration
Teacher Notes

Annual Seasonal Migration of the Bison

Northern Plains bison exhibited interesting behaviour during their annual seasonal migration.

Put up overhead (found on next page in unit plan).

Also (if available) use a map of North America to show students the extent of the bison migration route.

Draw the annual seasonal migration route described below on the blackboard, using clockwise or counter-clockwise migration pattern (bison would have likely taken both routes – clockwise and counter-clockwise). Following the migration route (that's explained below), you should end up making a complete circle from the northern parklands area, where most bison would spend the winter, south to the southern Plains, where most bison would have spent their springs (and gave birth) and summers (and mated in the late summer). In the late fall, the bison would have migrated northward, towards the parklands (back to the where the winter migration route began).

THE BISON ANNUAL SEASONAL MIGRATION ROUTE:

In the **winter**, most bison would be found in the **northern parklands area** (located just north of Saskatoon), where they would migrate to to seek protection and shelter from the harsh winter winds and weather, and where they would have access to a small supply of grasses and water in order to survive the harsh weather. (** Mention to students that male bison were more solitary animals than female and juvenile bison, and were known to be found away from the bison herds (females and juveniles), and would not always follow the usual seasonal migration route the other bison followed.)

Then, when the snow melted in the **early spring**, the bison would move **southward**, to **the southern plains** in Saskatchewan and the United States (ie, Montana), where they would have access to and grazed on the nutritious short-grasses and sources of water that were available in these areas. They would also **give birth** to their calves in the spring. (Mention to students that bison have a nine-month gestation period, like humans do.)

In the **summer**, the bison would still be found on the **southern plains**. Bison would **mate** in the **late summer**. The males that preferred a more solitary lifestyle, would then depart from the herd.

Then in the **fall**, just before the cold/harsh winds began to blow and the snow began to fall, the bison would migrate **northward** to the **parkland area**. This would complete the annual seasonal migration of the Northern Plains bison.

LESSON 4:
Bison of the Northern Great Plains (cont.)
Bison Annual Seasonal Migration
Overhead

ANNUAL SEASONAL MIGRATION OF THE NORTHER PLAINS BISON

WINTER: Bison would be found in the northern parklands area (just north of Saskatoon), where they would have access to a small supply of grasses and water, and where they could seek shelter from the cold winter winds (in the bush).

SPRING / SUMMER: When the snows melted, the bison would move southward, to the southern plains in Saskatchewan and the United States (ie, Montana), where they would have access to nutritious short-grasses, and sources of water. Female bison would also give birth to their calves in the spring.

LATE SUMMER: Bison would mate.

FALL / LATE FALL: Before the harsh/cold winter winds began to blow, and the snow began to fall, the bison would migrate northward, back to the parklands, where they would spend the winter.

This completes the annual seasonal migration of the Northern Plains Bison herds.

LESSON 5:
Bison of the Northern Great Plains (cont.)

- **The Bison, Past and Present: The Effects of European Contact on the Bison and Northern Plains Aboriginal peoples**
- **Bison Hunting on the Northern Plains: Three Methods**

THE BISON: PAST AND PRESENT

Put up overhead, The Bison (with 3 columns, Long Ago, 1870s, Present Day) - included with this lesson.

During the last class, it was discussed how the bison moved continuously on their seasonal migration. They would move southward in the summer and feed on the extremely nutritious short grasses available on the Northern Plains (southern Saskatchewan, and northern Montana and North Dakota), and then, after giving birth to their calves and mating in this area, they would move northward, to seek shelter in the Parkland area (in the Saskatoon area, and just north of here).

Before the time of European contact in this region, which again, is around the mid 1700s, the people who lived on the Northern Plains would have been spread out all across the Northern Plains, living a nomadic lifestyle, as they followed the bison herds. People had access to thousands of bison who lived on the Northern Plains, and, thus, these people were living in relative abundance during pre-contact times.

It has been said that there were so many bison on the Northern Plains during pre-contact times that you could feel the ground shaking even when the bison were miles away.

You also know that the bison was the main source of food and resources for the people of the Northern Plains.

Bison were a symbol of generosity to Northern Plains people:
- The bison fed and clothes the people of the Northern Plains.
- The bison hides provided shelter.
- People made tools from the bisons' hoofs, horns and bones.
- Bone chips were used as fuel by people of the Northern Plains.

They were instrumental to the lifestyles of the peoples of the Northern Plains.

The arrival of Europeans in this area brought with it significant changes to the lifestyles of Aboriginal peoples:
- Horses came into the area from the south.
- The bow and arrow technology was introduced into this region.
- Iron projectile points were also introduced into this region.
- Europeans introduced guns to Northern Plains people.

Peoples of the Northern Plains were affected by the introduction of these new technologies, as well as by the Fur Trade. The Fur Trade is something you will cover in much greater detail in Grade XII—but I'll just mention here that Aboriginal peoples played a major role during the Fur Trade, acting as provisioners of furs, pemmican and other resources for the forts and fur trading posts that had been established on the Prairies, and also as middlemen for the fur trade with the Europeans. The lifeways of Canada's Aboriginal peoples were changed forever as a result of the arrival of Europeans.

The herds of bison that roamed this area were also greatly affected as a result of European contact. During this time, the bison were hunted much more aggressively by Native and non-native people.

Bison meat was in great demand during the fur trade era as it served as the main ingredient in Pemmican, which was the major source of nutrition during the Fur Trade.

Also, bison were also hunted for their hides, which were turned into robes and coats, most of which were sold through the United States, via an extensive transportation system along the Missouri and Mississippi Rivers.

Unfortunately, by the 1870s the bison herd populations on the Northern Plains and Great Plains dropped drastically, and the herds were no longer able to replenish themselves.

By the 1870s the people of the Northern Plains were no longer able to depend upon the bison for their food and other resources. The people of the Northern Plains were no longer bison hunters. Thus, their lifeways were changed forever.

BISON HUNTING ON THE NORTHERN PLAINS: DESCRIPTION OF 3 METHODS

Use Overheads to depict each hunting method – included with this lesson.

1. Jump
2. Pound
3. Surround

The ancient communal bison hunting methods included driving bison over cliffs (bison jumps), or into corrals (bison pound) or experienced hunters encircling a herd of bison (bison surround). All were highly-effective methods of hunting bison.

Each of these methods required many days of preparation, great skill on the part of the many hunters who participated in the hunt, and the presence of special landscapes including cliffs (for the jumps), or depressions in the landscape (for the pounds and surrounds).

Extensive knowledge of bison behaviour by the bison hunters was also very important. Bison hunters were aware that bison had poor eyesight, but an excellent sense of smell. Also, hunters knew that when bison were running, it would be difficult for them to stop. Therefore, the goal in the bison hunt would be to herd the bison into a certain area, whether it be down a drive lane and toward a cliff edge, or into a depressed area like a ravine, and into an area where a surround or a group of experienced would be waiting, ready to dispatch or kill the bison.

As people of the Northern Plains began to acquire large numbers of horses, these ancient hunting techniques eventually gave way to the mounted buffalo hunt. The Blackfoot, Plains Cree and Plains Assiniboine did not receive horses until the 1730s. Hunting bison on horseback supplanted traditional bison drive techniques by the eighteenth century (the 1700s), and probably contributed also to the depletion of the bison herds by the mid to late 1800s.

Teacher Resources
Overheads:
- The Bison: Long Ago, 1870s, Present Day (3 columns)
- Bison Hunting Methods, 3 overheads: Jump, Pound, Surround

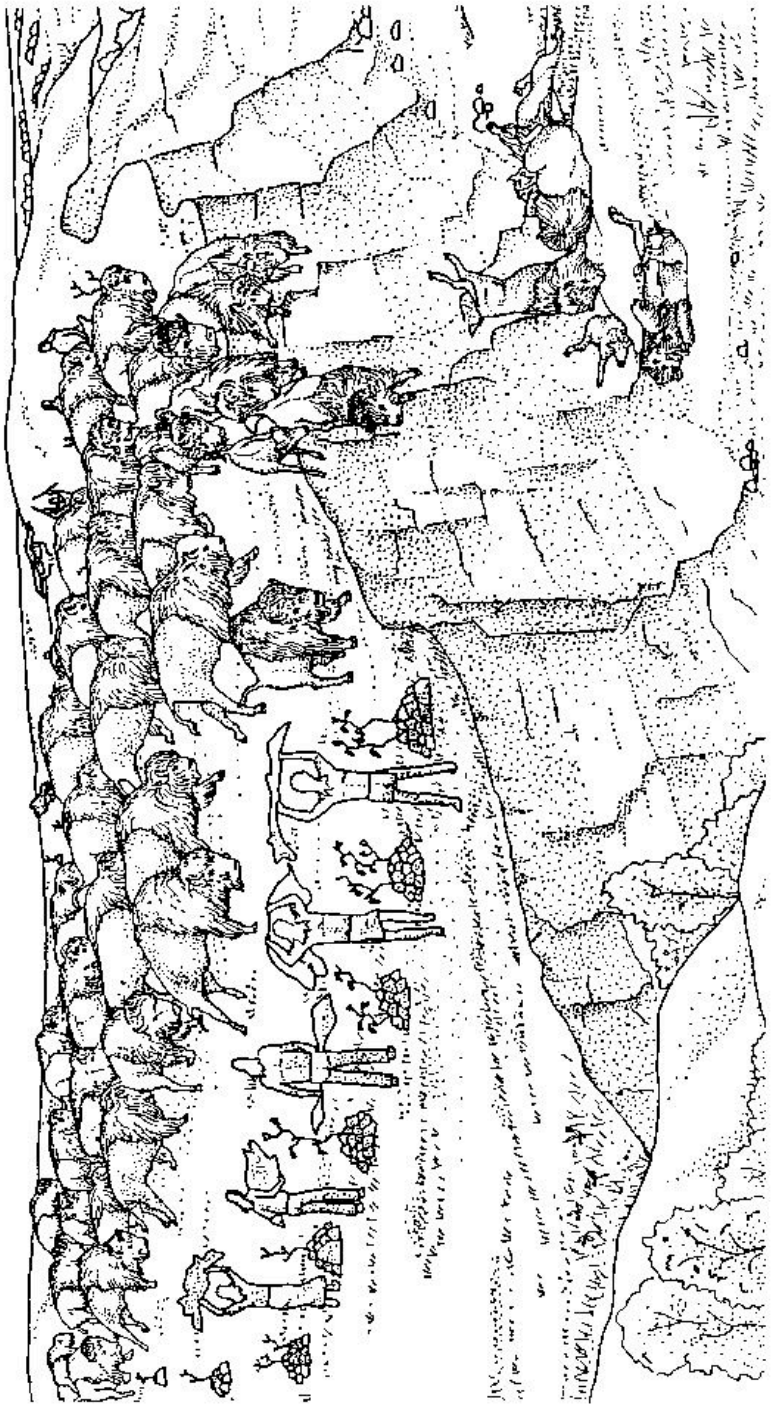
LESSON 5:
Bison of the Northern Great Plains (cont.)
The Bison: Past and Present
Overhead
(Adapted from materials created by Wanuskewin Heritage Park, Saskatoon, SK)

THE BISON: PAST AND PRESENT

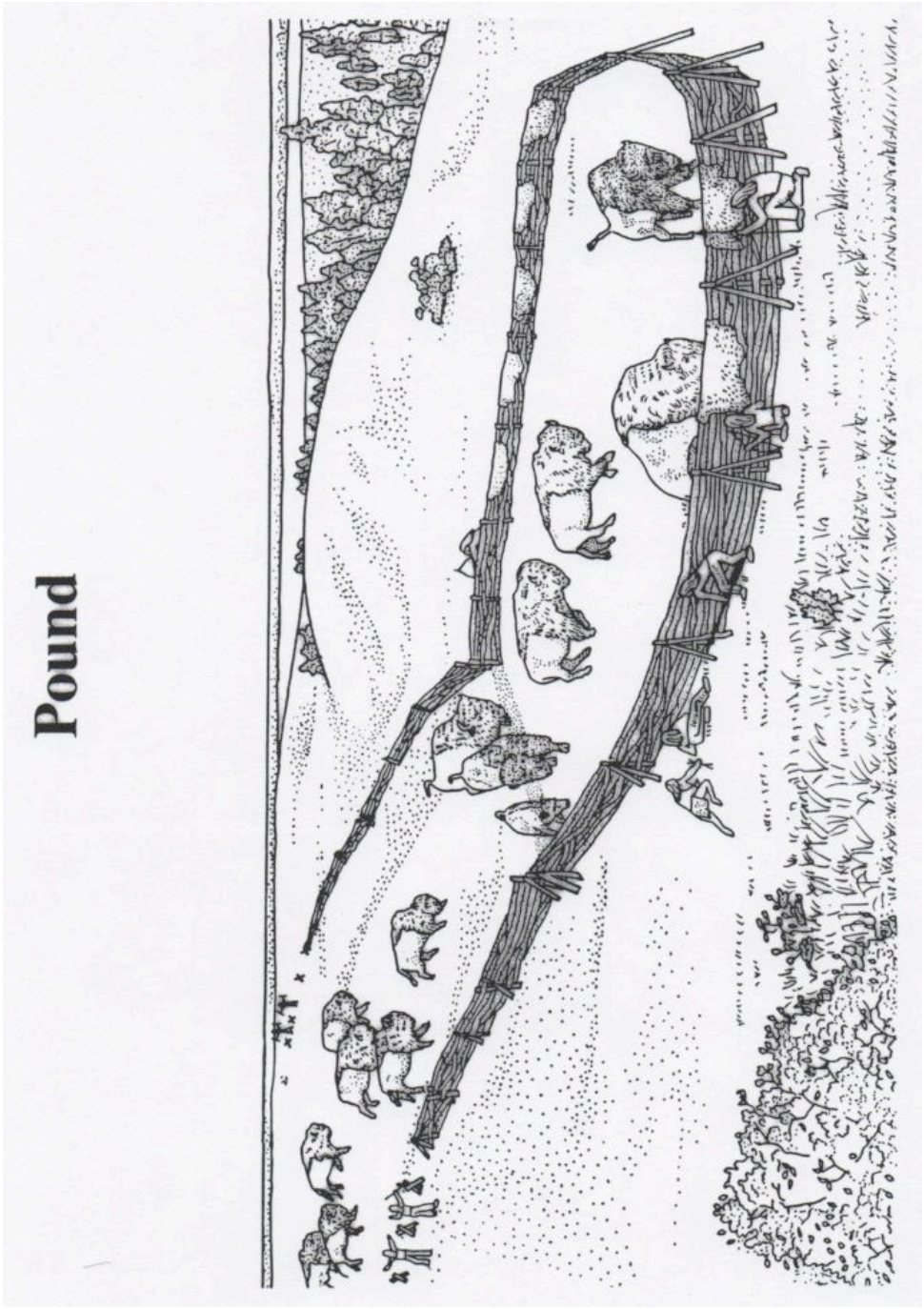
LONG AGO	1870's	PRESENT
- plentiful (~60 million)	- bison slaughtered almost to extinction	- ~ 6,500 bison exist
- freedom to migrate/access	- provided meat for trading posts and forts	- live in protected areas in Canada
- used as a source of food, clothing, tools and	- commercial demand for bison hide robes (in USA)	- disease is the biggest threat to bison
- killed by the jump, pound and surround methods, with spears and bow/arrow	- horses made hunting bison easier	- raised on game farms as an exotic meat source
- vital for human survival	- technology included iron projectile points and rifles	- laws for revitalization have been passed to protect the bison
changing world	- vital for survival in a	

LESSON 5:
Bison of the Northern Great Plains (cont.)
Bison Hunting Methods - Jump
Overhead
(Source: Wanuskewin Heritage Park, Saskatoon, SK)

Jump



LESSON 5:
Bison of the Northern Great Plains (cont.)
Bison Hunting Methods - Pound
Overhead
(Source: Wanuskewin Heritage Park, Saskatoon, SK)



<u>LESSON 5</u>:
Bison of the Northern Great Plains (cont.)
Bison Hunting Methods - <u>Surround</u>
Overhead
(Source: Wanuskewin Heritage Park, Saskatoon, SK)

Surround

LESSONS 6 to 9 (9 days):
Excavation (5 days)
Lab work and Artifact Analysis (1 day)
Interpretation Activity (1 day)
Create and Set-up Display (2 days)

EXCAVATION = 5 days (5 x 1 hr. = 5 hrs. / class)

- Students work in groups of 4.

- Each student performs a different aspect of excavation work: trowelling, screening and paperwork each day.

- Daily logs and artifact/feature paperwork kept by person in charge of paperwork on a daily basis, and kept on file by one person in the group in order that this paperwork will be locatable and referred to when students write up their final report regarding the excavation.

Materials Required:

All required excavation tools in assembled in kits.

- ** Optional: It would be useful for someone to be taking photographs of each class of students excavating, and have the photographs developed as soon as possible in order that that students will be able to include these photos in the creation of their display (in posters, etc.)

LAB ANALYSIS = 1 day

- Set up in basement of school – exact location to be confirmed by History Department Head.
- Wash/clean, classify and catalogue artifacts recovered from the High School Archaeological Site.

Materials Required:

- 7 Tables – lined with paper towel (use brown paper towel rolls)

  - 2 for storing artifacts, 2 for washing equipment, 2 for weigh/measuring/etc., and 1 for catalogue sheets

- 6 Pails, 3 per table washing/cleaning artifacts; half-filled with warm water (change water between each class – use janitorial room to do this)
- 12 Toothbrushes, 2 per pail, with some extra on hand for dry brushing, etc.

- a handful of wooden skewers (to clean dirt from bone/faunal material
- 2 rolls of paper towels (get from the janitorial staff; line all tables with paper towel; change paper towels between each class
- 3-4 weigh scales, borrowed from the Science Department; **be sure to advise students that the scales are valuable and any mistreatment of them will not be tolerated. Be sure to return them to the Science Department teacher who loaned them as soon as finished labwork (that day).
- 2 wooden yardsticks – (ask a teacher for them)
- 4 magnifying glasses – (get from Science Dept.)
- 10-12 catalogue sheets – 2 per class

INTERPRETATION ACTIVITY = 1 day

- Based on evidence recovered from the site.

- Have artifacts processed in lab available for viewing.

- Plot location of artifacts/features on a large, laminated grid school's site. History Department Head should know where the laminated grid is stored.

- Use dry, erasable markers in different colours (ONLY) to designate unit numbers, and plot artifacts and features (according to the legend created for the different artifacts/features)

Materials Required:
- Laminated grid of school's site
- Dry, erasable markets – 4 or 5 different colours

CREATE AND SET-UP DISPLAY = 2 days

- Students will work in their excavation groups, each creating 1 poster to be put on display on the Main Library display case.

- The laminated grid, with artifacts/features plotted, will also be put on display.

- Artifacts recovered from the site during the most recent field season will be put on display.

- Tools archaeologists use (trowel, pail, dustpan and brush, tape measure, line level, other brushes, etc.) will accompany the display.

- Plan with Library staff ahead of time in order to ensure use of display case.

Materials Required:
- plotted, laminated grid map of the school's site
- artifacts
- posters created by students – with photographs, hand-drawings, typed descriptions of artifacts/features, Northern Plains lifeways, etc. (create posters at least a day before they are put on display – that's why this is a 2-day activity – students may create posters after hours, at home as well)
- tools used during excavation
- tape (to tape grid, posters, etc. onto glass in display)

ARCHAEOLOGY UNIT TEACHER RESOURCES

Lesson 1

Archaeological Survey of Alberta
n.d. Dig and Discover: Archaeological Excavations for the Classroom. Alberta Culture and Multiculturalism, Edmonton, AB.

Boutilier, Brenda, Paul Erickson, Denise Hansen, and David Williamson
1992 Discovering Archaeology, An Activity Book for Young Nova Scotians. Nova Scotia Archaeology Society, Halifax, NS.

Parks Canada
1991 Discovering Our Past – Through History and Archaeology, Teacher's Guide. Component of Parks Canada's Edu-Kit. Contact Parks Canada, or e-mail Denise Hanson at denise_hansen@pch.gc.ca for more information.

Schoolnet Digital Collections Program
2006 Archaeology: A Step Back In Time, The Grassy Island Experience. Electronic document, http://collections.ic.gc.ca/archaeology/, accessed April 10, 2006.

Lesson 2

Artifact Collection: Faunal, Lithics, Ceramics available from the University of Saskatchewan, Department of Archaeology and Anthropology, Contact: Dr. Ernie Walker, 966-4181, or the Main Office (to leave a message for Dr. Walker) at 966-4175. He will arrange for a collection of artifacts to be put together, and someone from the school will have to pick up and return same.

*** It is recommended that an Archaeology major undergraduate, or an Archaeology graduate student come into the class to present and describe these artifacts. Arrange through Professor Walker.

Archaeology Edu-Kits and Northern Plains Projectile Point Display: suitable for all school grade levels, are available for loan to members of the Saskatchewan Archaeological Society. Contact Tim Jones, #1 - 1730 Quebec Ave., Saskatoon, SK S7K 1V9, phone: 664-4124, fax: 665-1928, email: saskarchsoc@sasktel.net

Film: "Basic Archaeology Methods: An Introduction to Excavation," available for loan from: University of Saskatchewan, Division of Media and Technology, Room 25, Education Building, 28 Campus Drive,
Saskatoon, Saskatchewan, Canada S7N 0X1, Phone: (306) 966-4271, Fax: (306) 966-2412, General Inquiries: dmt@usask.ca

Lesson 3
None.

Lesson 4:

Video: The Secrets of Wanuskewin. St. Joseph HS Library has a copy of this video.

Overhead: Picture of bison: for students to identify 19 parts of the bison, and their uses. Accompanied by an answer sheet.

Overhead: Seasonal Migration of the Northern Plains Bison (Winter, spring and summer, late summer and fall)

Linnamae, U. and T. E. H. Jones.
1988 Out of the Past. Saskatchewan Archaeological Association, Saskatoon.

Walker, E. G.
1992 The Gowen Sites. Canadian Museum of Civilization, Hull, PQ.

Lesson 5:

Overheads:
- The Bison: Long Ago, 1870s, Present Day (3 columns)
- Bison Hunting Methods: Jump, Pound, Surround (3 overheads)

Lessons 6-9:
None.

APPENDIX H

SUBURBAN HIGH SCHOOL
ARCHAEOLOGY PROJECT
- ARTIFACT CARD -

Site #: _____ Unit #: _____

Quadrant NW / NE / SW / SE (circle one)

Artifact or Fragment (circle one)

If an artifact, South and East locations (from unit datum point):

South =

East =

If an artifact, depth in cm:

Description of fragment bag or artifact

Classroom Period 1 2 3 4 5 (circle one)

Teacher's name

Date Student's initials

APPENDIX I

SUBURBAN HIGH SCHOOL ARCHAEOLOGY PROJECT
- LEVEL RECORD -

Please complete at the end of each day of excavation, and HAND TO YOUR TEACHER

Site #: _____

Unit: S _____ E _____ Date: _____

Names of all students in group:

1 _____

2 _____

3 _____

4 _____

5 _____

Classroom period 1 2 3 4 5 (circle one)

Teacher's name: _____

Excavation method (circle all that apply): trowel dust pan pail brush other

Describe artifacts found today: _____

_____

Student's comments: Please describe your experience today
(this counts towards your participation mark):

1 _____

2 _____

3 _____

4 _____

5 _____

Initial of student doing paperwork: _____

APPENDIX J

SUBURBAN HIGH SCHOOL
ARCHAEOLOGY PROJECT
- LAB CARD -

SITE #: _____ UNIT #: _____ QUADRANT: _____

PROVENIENCE (South and East locations from unit datum point):

South: East: _____

ARTIFACT TYPE _____

DESCRIPTION OF ARTIFACT:

____

WEIGHT OF ARTIFACT (IN GRAMS):

____

MEASUREMENTS, LENGTH/WIDTH (IN CM):

____

STUDENT'S INITIALS: _____

**** Students: Please transfer information from this Record to the (1) catalogue sheet and (2) laminated site map.**

(Actual size of artifact card 3" x 5")

SUBURBAN HIGH SCHOOL
-- CATALOGUE OF ARTIFACTS --

TEACHER: _____ PERIOD: _____ DATE: _____

Artifact # (typed below)	Unit #	Quadrant (NW, etc.)	Artifact or Frag (write A or F)	Depth of Artifact (in cm)	South Position (in cm)	East Position (in cm)	Weight of Artifact (in grams)	Length of Artifact (in cm / mm)	Description of Artifact (lithic, faunal, pottery, other)	Student's Initials
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										
19.										
20.										

- ARTIFACT CATALOGUE SHEET -